ADEQ
Arizona Department
of Environmental Quality

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Air Quality Division

Draft Yuma PM_{10} Maintenance Plan

MARCH 1, 2006

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EXECUTIVE SUMMARY

Yuma County comprises the southernmost part of the Colorado River Valley. Yuma, the county seat, is located just below the confluence of the Colorado and Gila Rivers. The cities of Phoenix and Tucson are located 185 miles to the northeast and 241 miles to the east, respectively. San Diego, California is 181 miles west of Yuma, and Los Angeles is 288 miles to the northwest.

The nonattainment area is geographically located in the Lower Colorado River Valley in the southwestern part of Yuma County in a vast area of the Sonoran Desert. The Yuma PM_{10} Nonattainment Area contains a total of 16 full and partial townships. This is the equivalent to about 12 full townships, comprising about 456 square miles or 300,000 acres. The nonattainment area is defined by the following townships (40 CFR § 81.303):

T7S- R21W, R22W;
T8S-R21W, R22W, R23W, R24W
T9S-R21W, R22W, R23W, R24W, R25W;
T10S-R21W, R22W, R23W, R24W, R25W.

Review of the ambient air concentrations for calendar years 2002, 2003, and 2004 reveals that the 3-year annual average was 43.4 ug/m^3. The design value is 87 percent of the annual standard. Yuma air quality did not violate the annual standard for the three-year period from 2002 through 2004.[1] Thus, the Yuma area attained the annual PM_{10} NAAQS.

Based on the most recent three years of air quality data (2002, 2003, and 2004), the 24-hour average design value for the Yuma area is 127 ug/m^3. The design value is 85 percent of the 24-hour standard. This plan demonstrates that the control measures modeled to reduce the 24-hour design value will concomittantly reduce the annual design value.

ADEQ modeled attainment for both the 24-hour PM_{10} NAAQS and the annual PM_{10} NAAQS through 2016 for the Yuma air quality planning area. This maintenance plan predicts attainment for the next 10 years. If an exceptional event causes the Yuma area to exceed the 24-hr average NAAQS, ADEQ will flag the event as a natural event and begin the procedure required by EPA to update the Yuma NEAP. If the exceedance occurs outside of the Yuma Nonattainment Area, it will not be flagged.

[1] PM_{10} concentrations reported at the Juvenile Center monitoring site in Yuma showed one exceedance of the 24-hour PM_{10} NAAQS caused by a high wind event on August 18, 2002. According to EPA's Natural Events Policy (NEP), this measurement does not count as a violation. Consequently, the three-year average number of exceedances was less than 1.0.

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1.0 BACKGROUND

1.1 Yuma Moderate PM_{10} Nonattainment Area

Yuma County comprises the southernmost part of the Colorado River Valley. Yuma, the county seat, is located just below the confluence of the Colorado and Gila Rivers. The cities of Phoenix and Tucson are located 185 miles to the northeast and 241 miles to the east, respectively. San Diego, California is 181 miles west of Yuma, and Los Angeles is 288 miles to the northwest.

The nonattainment area is geographically located in the Lower Colorado River Valley in the southwestern part of Yuma County in a vast area of the Sonoran Desert (see Figure 1-1). The Yuma PM_{10} Nonattainment Area contains a total of 16 full and partial townships. This is the equivalent to about 12 full townships, comprising about 456 square miles or 300,000 acres. The nonattainment area is defined by the following townships (40 CFR § 81.303):

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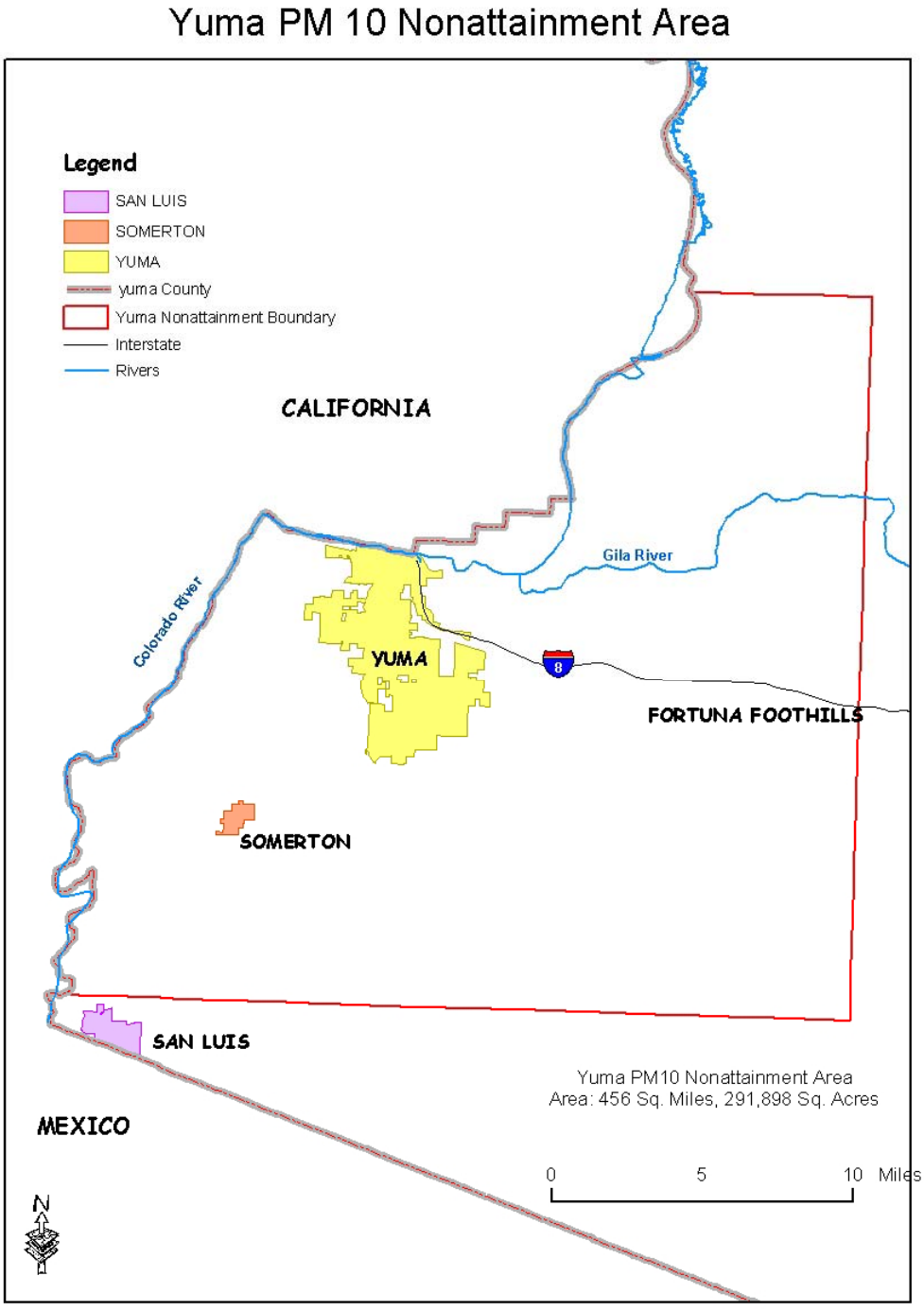
T9S-R21W, R22W, R23W, R24W, R25W;
T10S-R21W, R22W, R23W, R24W, R25W.

Figure 1-1


Yuma PM 10 Nonattainment Area
Legend
SAN LUIS
SOMERTON
YUMA
yuma County
Yuma Nonattainment Boundary
Interstate
Rivers
CALIFORNIA
Gila River
Colorado River
YUMA
8
FORTUNA FOOTHILLS
SOMERTON
SAN LUIS
MEXICO
Yuma PM10 Nonattainment Area
Area: 456 Sq. Miles, 291,898 Sq. Acres
0
5
10 Miles
N

1.2 Climate

Yuma is Arizona's warmest winter city and the sunniest year-round place in the United States, with an annual average of 4,133 hours of sunshine. Yuma has a classic low desert climate with extremely low relative humidity and very high summer temperatures. Yuma is one of the driest cities of its size in the United States, with a mean annual precipitation of 2.94 inches, based on a 30-year average. It lies too far south to benefit from the winter fronts which impact northern Arizona and it lies too far west to receive rain associated with the summer monsoons.

Table 1-1 depicts the monthly climate summary for Yuma. The table was compiled by the Western Regional Climate Center from data for Yuma from September 1, 1945, to March 31, 2005. Although the winters in Yuma are rather mild, the summers are very hot. Table 1-1 reveals that July is the hottest month with an average maximum temperature of 107.0°F. January is the month with the lowest average maximum temperature with an average maximum temperature of 68.5°F.

With respect to average minimum temperatures, July is the month with the highest average minimum temperature of 80.4°F. The month with the lowest average minimum temperature is January at 44.1°F.

Table 1-1

Yuma Monthly Climate Summary													
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Annual**
Average Max. Temperature (F)	68.5	74.3	79.2	86.8	94.0	103.4	107.0	105.8	101.6	91.0	77.7	68.7	88.2
Average Min. Temperature (F)	44.1	46.9	51.0	56.9	63.7	72.1	80.4	79.9	73.8	62.4	51.0	44.4	60.6
Average Total Precipitation (in.)	0.43	0.22	0.23	0.12	0.05	0.01	0.22	0.51	0.27	0.29	0.19	0.43	2.96

Period of Record: 9/1/1945 to 3/31/2005

SOURCE: Western Regional Climate Center

1.3 Population

The principal communities in the Yuma PM_{10} Nonattainment Area are the Cities of Yuma and Somerton. Since 1970, the population of Yuma has increased more than two and one-half times while the population of Somerton has more than tripled. After adjusting for the La Paz County split, Yuma County experienced a similar growth pattern by tripling its population during the same time period. Similarly, Arizona's population also tripled.

During the 1970s, Yuma County grew at a rate of 25.3 percent while Yuma and Somerton grew at rates of 46.4 percent and 78.4 percent, respectively. The growth rates of Yuma and Somerton were similar during the 1980s and 1990s. Yuma County, however, grew at a greater rate during both the 1980s (40.3%) and 1990s (49.7%). Decennial census data for Yuma, Somerton, and Yuma County are shown in Table 1-2.

The Census population noted above does not take into account the Yuma area's seasonal population. Norton Consulting estimates that 56,000 winter visitors/residents were in the Yuma Metropolitan Statistical Area (MSA) in mid-February (2005), the traditional peak of the season. The winter visitors come to Yuma to enjoy the mild winter climate.

Table 1-3 portrays 1997 growth projections by the Arizona Department of Economic Secuirty (DES) for the cities of Yuma, Somerton, and Yuma County in five-year increments from 2000 to 2015. Projected populations for Yuma and Yuma County for 2000 and 2005 are significantly less than the 2000 Census enumerated populations. Likewise, the projected population for Somerton for 2000 is less than the 2000 Census enumerated population. In 2015, the City of Somerton is projected to have a population of 9,001. This amounts to a projected increase of 23.9.7% over its 2000 census population. The projected 2015 population for the City of Yuma is 90,271. This is a projected increase of 16.5% over Yuma's 2000 census population. Yuma County's 2015 projected population is 189,783. This amounts to a projected increase of 18.6%.

Table 1-2. Decennial Census Population of Yuma, Somerton, and Yuma County: 1970 - 2000

Year	April 1 1970	April 1 1980	April 1 1990	April 1 2000
Yuma	29,007	42,481	56,966	77,5151
Yuma's decennial change		46.4%	34.1%	36.1%
Somerton	2,225	3,969	5,282	7,266
Somerton's decennial change		78.4%	3.1%	37.6%
Yuma County	60,827	76,205	106,895	160,026
Yuma County's decennial change		25.3%	40.3%	49.7%

SOURCE: U.S. Bureau of the Census, decennial census counts. The northern part of Yuma County was split into La Paz County with the southern part retained as Yuma County on January 1, 1983. The 1980 Yuma County population does not contain the population that was enumerated in the La Paz County portion. The 1970 Census comprises the original Yuma County boundary.

[1] The 2000 Census shows a population of 77,515 with 34,475 housing units of which 26,649 are occupied (22.7% vacant). The number of occupied housing units equals the number of households residing in Yuma with 2.79 persons per household. Yuma also has a group quarters population of 3,144. Persons not living in households are included in group quarters. Group quarters is classified into institutionalized persons (patients or inmates) and noninstitutionalized persons (rooming houses, group homes, dormitories, shelters, and similar quarters).

Table 1-3. Population Projections for Yuma, Somerton, and Yuma County: 2000 - 2015

Year	July 1, 2000	July 1, 2005	July 1, 2010	July 1, 2015
Yuma	67,809	74,347	81,836	90,271
Somerton	6,729	7,475	8,224	9,001
Yuma County	138,025	154,582	171,689	189,783

Source: Arizona Department of Economic Security, August 1, 1997. DES has not produced any new population projections for Arizona since 1997.

1.4 Economy

Agriculture is the primary industry in Yuma, and its health helped offset some of the impacts of the post 9-11 economic downturn. In the second quarter of 2005, 8,001 people in Yuma County were employed in Agriculture, Forestry, Fishing and Hunting. Agriculture contributed over $800 million to Yuma County's economy in 2002. Yuma County also ranks highest in Arizona in terms of crop production and livestock raising.

Yuma County's net cash farm income in 2002 was over $338 million, amounting to 51.8% of the total net cash farm income for all of Arizona. Yuma County ranked first in the state in the production of Durum wheat for grain, land in orchards, acres in vegetables, and winter wheat for grain in 2002; it ranked second in the state in the production of Pima cotton in 2002.[2]

Yuma County is the Nation's winter salad bowl, producing 85-90% of the Nation's winter vegetables. There are times during mid-winter and into the early spring when fully 90-95% of the iceberg lettuce for the United States and Canada comes from Yuma County fields.

The tourism industry in Yuma has remained healthy, despite fears of a potential drop in tourist traffic following the terrorist attacks that occurred on September 11, 2001. The industry has seen a significant expansion of capacity in new RV parks and hotels. Since most of Yuma's visitors arrive via automobile, tourism

[2]U. S. Census of Agriculture, 2002.

has only been moderately affected by the recent economic slowdown. The summer tourist season is not as important in Yuma.

The government, and especially the military, plays a major role in the local economy. Home to the Marine Corps Air Station and the U.S. Army Garrison Yuma, the military presence in Yuma is estimated to generate almost $260 million annually in terms of an economic impact on the metro area. The military presence is a stabilizing force, providing a boost to the local economy.

Employment growth in Yuma County is expected to accelerate in the coming years. Population growth and low-business costs will remain the two structural drivers for growth in the Yuma area. Although employment opportunities exist in several key economic sectors, many job creations may be low paying or seasonal. In the longer term, Yuma County employment growth is expected to continue to grow due to strong in-migration.

Table 1-4 contains employment data by economic sectors for Yuma County for the years 2000-2005. These data represent annual averages through 2004 and the average of the first one-half of 2005. The total civilian labor force grew by more than 17 percent from 2000 through 2004. If the civilian labor force maintains the growth during the first one-half of 2005, the overall growth rate for the years 2000 through 2005 would be about 26 percent.

According to Table 1-4, employment sectors registering more than 30 percent rowth between 2000 and 2004 include the following, in descending order of rowth: Administrative and Waste Services, Professional and Technical Services, nformation, Construction, Transportation and Warehousing, and Health Care and Social Assistance. Employment sectors showing declines or growth less than 12% include the following: Management of Companies, Wholesale Trade, Utilities, Agriculture, Forestry, Fishing, and Hunting; Mining; Professional and Technical Services; Finance and Insurance; Retail Trade; and Other Services. The other sectors showed employment gains ranging from 15 percent to almost 27 percent. Employment growth for Public Administration and Manufacturing sectors, for example, was approximately 26 percent each.

Table 1-4. Employment by Sector for Yuma County: 2000–2005

Employment Sector	2000	2001	2002	2003	2004	2005
Total Civilian Labor Force	52,303	54,705	55,960	58,014	61,415	65,960
Agriculture, Forestry, Fishing, and Hunting	14,349	14,751	15,347	14,860	15,254	15,636
Mining	24	N/R	N/R	N/R	22	25
Utilities	414	424	435	430	443	395
Construction	3,006	3,063	3,390	3,661	4,370	4,664
Manufacturing	2,337	2,145	1,840	2,531	2,933	3,248
Wholesale Trade	1,916	1,926	1,714	1,694	1,578	1,742
Retail Trade	6,416	6,690	6,385	6,460	7,172	7,837
Transportation and Warehousing	1,083	1,219	1,328	1,318	1,441	1,404
Information	783	863	953	1,056	1,147	1,144
Finance and Insurance	667	674	668	683	739	757
Real Estate and Rental and Leasing	651	645	687	668	720	753
Professional and Technical Services	626	669	748	871	965	1,155
Management of Companies	152	138	120	120	119	121
Administrative and Waste Services	1,428	1,691	2,010	2,770	2,259	2,259
Educational Services	4,251	4,371	4,547	4,723	5,039	5,440
Health Care and Social Assistance	4,180	4,585	4,912	5,270	5,498	5,666
Arts, Entertainment and Recreation	1,209	1,212	1,228	1,266	1,408	1,393
Accommodation and Food Services	4,203	4,469	4,413	4,490	4,840	5,486
Other Services	1,144	1,144	1,110	1,066	1,118	1,158
Public Administration	3,376	3,958	4,069	4,030	4,279	5,597
Unclassified	88	68	56	47	71	80

Source: Arizona Department of Economic Security, Research Administration, in cooperation with the U.S. Department of Labor, Bureau of Labor Statistics, ES-202 (covered employment and wages). Some data corrections were made. Data for 2005 represent an average of 1st and 2nd quarters of 2005. Economic sectors based on North American Industrial Classification System. N/R=Not Reported.

Table 1-5 shows a selected time series of civilian labor force data for the City of Yuma

and Yuma County for the timeframe 2000–2004. Complete data for 2005 were not available at the time of this writing. Table 1-5 reveals that for every year during this timeframe, the unemployment rate for Yuma County was over 15 percent. The unemployment rate for the City of Yuma, however, was slightly lower than that for Yuma County, being around 12 percent.

Table 1-5. Civilian Labor Force and Unemployment Data for City of Yuma and Yuma County*

Year	2000	2001	2002	2003	2004
City of Yuma civilian labor force	34,999	35,245	37,106	39,126	40,328
City of Yuma unemployment rate	12.7%	12.6%	12.8%	12.9%	11.8%
Yuma County civilian labor force	64,370	64,793	68,272	72,004	73,938
Yuma County unemployment rate	16.6%	16.4%	16.7%	16.8%	15.4%

Source: Arizona Department of Economic Security, Research Administration, Unemployment Rates and Labor Force Statistics (LAUS), 2005.
*Data are not seasonally adjusted.

1.5 Yuma Area Air Quality History

The Yuma area was designated as a moderate PM_{10} nonattainment area by operation of the 1990 Clean Air Act Amendments. The area violated the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS)[3] in 1990 and 1991 and had violated the annual NAAQS[4] in 1989 and 1990. ADEQ completed a state implementation plan (SIP) for the Yuma Moderate PM_{10} Nonattainment Area in 1991. Although the plan demonstrated attainment of the 24-hour and annual

[3] The 24-hour average PM_{10} standard is 150 ug/m^3. Concentrations at or below this amount are not a violation of the 24-hour standard. The 24-hour average PM_{10} monitored values for the Yuma area were 270 ug/m^3 in 1990 and 229 and 188 ug/m^3 in 1991.

[4] The annual average standard is 50 ug/m^3. Concentrations at or below this amount are not a violation of the annual standard. The annual average PM_{10} monitored values for the Yuma area were 52 ug/m^3 in 1989 and 57 ug/m^3 in 1990.

NAAQS through implementation of reasonably available control measures (RACM), EPA found the plan to be incomplete. ADEQ identified additional RACM being implemented in the Yuma area and updated the plan in 1994. Based on these additional control measures, the 1994 plan demonstrated attainment of the PM_{10} NAAQS by even a greater margin. EPA has never approved the SIP for the Yuma area.

Since 1991, the Yuma area had not violated either the 24-hour or annual NAAQS up until 2002. As a result of several years of "clean data", ADEQ began developing a maintenance plan and redesignation request for the Yuma area in 2001, because the improvements in local air quality were permanent and enforceable. ADEQ identified the various stakeholders in the Yuma area; these stakeholders include the local jurisdictions, the metropolitan planning organization, the agricultural community, federal agencies, two Native American tribes, a water users' association and irrigation districts, and the Arizona Department of Transportation. ADEQ began working with the stakeholders in July 2001 in developing the maintenance plan and redesignation request and continued to do so until an exceeedance of the 24-hour NAAQS occurred once again in Yuma on August 18, 2002, as a result of a massive thunderstorm that generated strong winds and windblown dust.

High wind events are a type of natural event covered by EPA's Natural Events Policy (NEP). Under the NEP, ADEQ developed and submitted a Natural Events Action Plan (NEAP) to EPA on February 17, 2004. As a result of this exceedance, the maintenance plan was temporarily postponed until ADEQ completed a NEAP for the Yuma area. The NEAP contains strategies that are currently being implemented by the local jurisdictions in the Yuma area to reduce particulates in the event of future high wind conditions in the Yuma area.

The NEP states that best available control measures (BACM) must be implemented for controllable sources of PM_{10} within 3 years after the first NAAQS violation attributed to high wind events. Consequently, ADEQ completed a report on the implementation of the BACM contained in the Yuma NEAP. ADEQ submitted the NEAP implementation report to EPA on February 17, 2005.

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2.0 CLEAN AIR ACT REGULATORY REQUIREMENTS

As a consequence of being designated nonattainment for the PM_{10} NAAQS, the Yuma area is required under the Clean Air Act Amendments (CAAA) of 1990 to meet certain legal requirements to attain the NAAQS and ensure that the area will comply with the NAAQS for the 10-year maintenance period following redesignation. The specific legal requirements are described below.

2.1 CAA Section 110(a)(2) – Enforceable Emissions Limitations and Other Control Measures

Section 110(a)(2)(A) of the CAA requires States to provide for enforceable emissions limitations and other control measures, means, or techniques, as well as schedules for compliance with the PM_{10} national ambient air quality standards. Chapter 6 includes a list of control measures that helped the Yuma area reach attainment and maintain the PM_{10} NAAQS up to the maintenance out-year of 2016.

Section 110(a)(2)(B) of the CAA requires States to monitor, compile, and analyze PM_{10} monitoring data on ambient air quality. Under ADEQ's air quality assessment program, ambient monitoring networks for air quality have been established to sample pollution in a variety of representative settings, to assess the health and welfare impacts, and to assist in determining air pollution sources. These networks cover both urban and rural areas of the State. Chapter 3 includes monitoring network information and data for the Yuma area. The samplers are certified as Federal Reference or Equivalent Methods. The protocol for PM_{10} monitoring used by the State, local agencies, and companies was established by EPA in 40 CFR Part 50, Appendices J and K and 40 CFR Part 58, Appendices A, D, and E.

Section 110 (a)(2)(C), Section 110 (a)(2)(E), Section 110 (a)(2)(F), and Section 110 (a)(2)(L) of the CAA requires States to have permitting, compliance, and source reporting authority. Arizona Revised States (ARS) § 49-402 establishes ADEQ's permitting and enforcement authority. As authorized under ARS § 49-402, ADEQ retains adequate funding and employs adequate personnel to administer the air quality program. Appendix A includes the organizational chart for ADEQ's Air Quality Division.

Under ADEQ's air quality compliance program, major sources are inspected annually, while minor sources are inspected every two to three years. However, minor sources may be inspected more frequently if they have had a record of problems in the past.

Section 110(a)(2)(G) of the CAA requires that States provide for authority to establish emergency powers and authority and contingency measures to prevent imminent endangerment. AAC R18-2-220 prescribes the procedures the Director of ADEQ shall implement in order to prevent the occurrence of ambient air pollution concentrations which would cause significant harm to the public health. As authorized by ARS § 49-426.07, ADEQ may seek injunctive relief upon receipt of evidence that a source or combination of sources is presenting an imminent and substantial endangerment to public health or the environment.

2.2 CAA Section 172(c) – Nonattainment Area Plan

Section 172(c) of the CAA requires that nonattainment plan provisions comply with each of the following:

Section 172(c)(1) of the CAA requires that nonattainment plan provisions provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable and demonstrate attainment of the primary NAAQS. Chapter 6 includes a description of RACMs already implemented in the Yuma area to control PM_{10} emissions.

Section 172(c)(3) and Section 172(c)(4) of the CAA require a current inventory of actual emissions from all sources of the relevant pollutant or pollutants and projected emission inventories. The 1999 base-year emissions and the 2016 projected emissions for the Yuma Nonattainment Area are contained in Chapter 4.

Section 172(c)(5) of the CAA require permits for the construction and operation of new or modified major stationary sources. All new sources and modifications to existing sources in Arizona are subject to State requirements for preconstruction review and permitting pursuant to AAC, Title 18, Chapter 2, Articles 1, 3, 4, and 5. All new major sources and modifications to existing major sources in Arizona are subject to the New Source Review (NSR) provisions of these rules, including Nonattainment Area Analysis (NAA) and Prevention of Significant Deterioration (PSD). The State NSR program was conditionally approved by EPA in 1982, but since then has been revised and is currently awaiting approval from EPA.

2.3 CAA Section 175A(d) – Contingency Provisions

Section 175A(d) requires the maintenance plan to contain contingency provisions that will assure that the State will promptly correct any violation of the PM_{10} NAAQS which occurs after the redesignation of the area as an attainment area. The provisions must also include a requirement that the State will implement all the control measures contained in the state implementation plan for the area before the redesignation of the area as an attainment area. Chapter 6 contains the control measures currently implemented in the Yuma area. Chapter 7 contains the contingency measures that will be implemented in the Yuma area in case of a future violation.

2.4 CAA Section 176(c)(1) – General Conformity

The CAA contains general conformity requirements that currently apply to federal agency-related activities, except transportation projects,[1] in the Yuma Moderate PM_{10} Nonattainment Area (40 C.F.R. §§ 93.150 - 160). The same requirements will continue to apply when the Yuma area is legally designated a maintenance area. The regulations are intended to ensure federal actions are consistent with state and local air quality planning. A conformity analysis must clearly demonstrate that federal projects will not: 1) cause or contribute to any new

[1]The Clean Air Act requires that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the Federal Highway Administration or Federal Transit Authority be in conformity with the state implementation plan through a separate process described in the transportation conformity regulation (Title 40 C.F.R., Parts 51 and 93, November 24, 1993, as amended in August and November 1995).

violations of the NAAQS; 2) interfere with provisions in the applicable SIP for compliance with the NAAQS; or 3) increase the frequency or severity of NAAQS violations. Any federal agency engaging, sponsoring, permitting or approving an action in the Yuma Nonattainment Area is responsible for making the conformity determination, in consultation with ADEQ. Those federal agencies in the Yuma area that must comply with the general conformity requirements are the BLM, BOR, Federal Aviation Administration (FAA), Department of Homeland Security, Marine Corps Air Station (MCAS), and the U.S. Army Garrison Yuma (AGY).[2] Chapter 7 contains ADEQ's commitment to enforce Article 14 of the Arizona Administrative Code. ADEQ has incorporated by reference Title 40 CFR Part 93, Subpart B in Arizona Administrative Code R18-2-1438.

2.4.1 Commitment to Meet General Conformity Requirement

ADEQ commits to work with the Federal agencies in the Yuma Moderate PM_{10} Maintenance Area to ensure that the CAA Sections 118 and 176 and 40 C.F.R. §§ 93.150 - 160 will be met for applicable federal projects. Examples given by EPA Region IX of Federal actions that have required conformity determinations in the past include: construction of a water treatment facility on federal land; construction of a new airport runway; expansion of a mine or quarry operation owned or operated by a Federal agency; residential housing construction on military installations; and increased aircraft and motor vehicle activity on military installations.[3]

2.5 CAA Section 176(c)(2) – Transportation Conformity

The CAA of 1977 contains transportation conformity requirements which state that transportation plans, programs, and projects in nonattainment areas cannot:

- cause NAAQS violations;
- increase the frequency or severity of existing NAAQS violations; or
- delay attainment of the NAAQS for the relevant pollutants in nonattainment areas.

The CAA requires that transportation improvement programs (TIPs), plans, and projects in nonattainment or maintenance areas that are funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) be in conformity with state implementation plans, including maintenance plans. The conformity process is described in EPA's transportation conformity regulation Title 40 CFR Part 93, Subpart A. Other projects that must undergo a transportation conformity analysis include:

[2]Arizona's general conformity program was submitted to EPA as a SIP revision in 1995. The program was approved on April 23, 1999 and became effective on June 22, 1999 (64 **FR** 78).

[3]These examples of activities requiring a conformity analysis were provided in a personal communication with Doris Lo, Environmental Program Specialist, in the EPA Region IX Air Division Planning Office.

- regionally significant[4] transportation projects not funded or approved by FHWA and/or FTA, but sponsored by recipients of FHWA/FTA funds, and
- regionally significant projects in rural nonattainment or maintenance areas.

2.5.1 Agencies Responsible for Transportation Conformity Determinations

The Yuma Metropolitan Planning Organization (YMPO) and the U. S. Department of Transportation (USDOT) have the responsibility to ensure that the transportation plans and programs within the Yuma Nonattainment Area conform to the maintenance plan. The policy board of the YMPO must formally make a conformity determination regarding its transportation plan and TIP prior to submitting them to the U.S. DOT for review and approval.

YMPO consults with the Air Quality Division of ADEQ in its preparation of its annual air quality analysis report.

2.5.2 Frequency of Transportation Conformity Determinations

Conformity determinations must be made at least every three years, or as changes are made to plans, TIPs, or projects. Certain events may also trigger new conformity determinations; for example:

- SIP revisions that establish or revise a transportation-related emissions budget or

- SIP revisions that add or delete transportation control measures (TCMs).

2.5.3 Motor Vehicle Emissions Budget

The foundation for a conformity determination is the motor vehicle emissions budget in the latest submitted or approved SIP. The motor vehicle emissions budget in the SIP acts as a ceiling for the transportation plan and TIP emissions. The motor vehicle emissions budget for the Yuma Nonattainment Area is contained in Chapter 4.

2.5.4 ADEQ's Role in Implementing Transportation Conformity

The Clean Air Act Amendments of 1990 made conformity requirements substantially more rigorous. In November 1993, EPA issued its final rulemaking (58 FR 62188) implementing the new requirements. ADEQ was subsequently required to adopt an Arizona transportation conformity rule (A.A.C. R18-2-1401 through 1438) that was

[4]"Regionally significant project" means a project that serves regional transportation needs and would normally be included in the modeling of a metropolitan area's transportation network. This includes, as a minimum, all principal arterial highways and all fixed guide-way transit facilities that offer a significant alternative to regional highway travel.

enforceable by the State and submit the rule to EPA as a revision to the SIP. ADEQ submitted the rule to EPA on June 20, 1995.

In July 1997, EPA revised its 1993 rule, providing state and local governments more authority in setting performance measures as tests of conformity. The 1997 rule also gave state and local governments more discretion at times when transportation plans do not conform to the SIP. ADEQ was required to revise its State rule to reflect the changes in EPA's 1997 rule and submit the updated rule as a SIP revision. As the result of the March 2, 1999, U.S. Circuit Court decision,[5] ADEQ is in the process of revising its transportation conformity rule.

2.6 CAA Section 189 – Plan Provisions and Schedules for Plan Submissions

2.6.1 Permit Requirements

Section 189 requires that the state implementation plan for the Yuma area include a permit program providing that permits meeting the requirements of section 173 are required for the construction and operation of new and modified major stationary sources of PM_{10}. All new sources and modifications to existing sources in Arizona are subject to State requirements for preconstruction review and permitting pursuant to AAC, Title 18, Chapter 2, Articles 1, 3, 4, and 5. All new major sources and modifications to existing major sources in Arizona are subject to the New Source Review (NSR) provisions of these rules, including Nonattainment Area Analysis (NAA) and Prevention of Significant Deterioration (PSD). The State NSR program was approved by EPA in 1982, and has been revised since then. A revision was submitted in 1995 but never acted upon. The program will be revised and resubmitted in 2006.

2.6.2 Attainment or Nonattainment Demonstration

Section 189 requires that the state implementation plan for the Yuma area include a demonstration that the plan will provide for attainment by the applicable attainment date or a demonstration that attainment is impracticable by that date. The 1991 Yuma SIP demonstrated attainment of the PM_{10} 24-hour and annual NAAQS by December 31, 1994. The 1994 revision to the SIP demonstrated attainment by an even greater margin.

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[5]On March 2, 1999, the U.S. Court of Appeals for the District of Columbia issued its opinion in Environmental Defense Fund (EDF) v. Environmental Protection Agency (No. 97-1637). The Court ruled against EPA on all issues. The Court ruled that EPA's 1997 rule, which allowed non-federally funded projects to be approved when the conformity status of a transportation plan or program has lapsed, violates the CAA requirement that all projects come from a currently conforming transportation plan and program. The Court also ruled that EPA's 1997 rule, which allowed projects previously found to conform with a SIP and approved for federal funding when the conformity status of a transportation plan and program has lapsed, violates the CAA requirement that all projects come from a currently conforming transportation plan and program. The Court ruled that EPA must harmonize the use of the emissions budget in currently disapproved SIPs with the CAA requirement that federal agencies affirmatively find that federal actions will not cause or contribute to new air quality violations, increase the frequency or severity of existing violations or delay timely attainment of the NAAQS. There is no longer a 120-day grace period before projects are frozen if a SIP is disapproved.

2.6.3 Provisions to Implement Reasonably Available Control Measures

Section 189 requires the plan for the Yuma area to contain provisions to assure that the RACMs for the control of PM_{10} be implemented no later than December 10, 1993. The local jurisdictions in the Yuma area had implemented their RACMs by this date and these control measures were enough to bring the area into attainment by December 31, 1994. The control measures that are being implemented in the Yuma area are contained in Chapter 6.

2.7 Applicable Clean Air Act Requirements with Respect to Redesignation

2.7.1 Redesignation to Attainment

Section 107(d)(3)(E) of the Clean Air Act (CAA), as amended, states that an area can be redesignated to attainment if the following conditions are met:

a) The NAAQS have been attained[6].

Chapter 3 makes the case that the 24-hr PM_{10} NAAQS and the annual average PM_{10} NAAQS have both been attained based on the most recent three years of monitoring data.

b) The applicable implementation plan has been fully approved under Section 110(k).

Since EPA is in the process of making a clean data finding for Yuma, EPA is not required to approve the 1994 Yuma State Implementation Plan. Under the clean data finding, the requirement to fully approve the applicable state implementation plan is waived.

c) The improvement in air quality is due to permanent and enforceable reductions in emissions.

Sections 1.3 and 1.4 of this Chapter described the population and economic growth that has been occurring in Yuma and Yuma County. Chapter 3 reveals that there has not been a violation of the PM_{10} NAAQS in Yuma since 1991. Chapter 6 describes the control measures that are currently in place to control PM_{10} emissions in the Yuma area and attain the NAAQS. Clearly, the improvement in air quality in Yuma is due to permanent and enforceable reductions in PM_{10} emissions. These reductions are expected to maintain the Yuma area in compliance with the PM_{10} NAAQS to at least 2016, the out-year of the maintenance plan.

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[6]Attainment of the 24-hour standard is determined by calculating the expected number of days in a year with PM_{10} concentrations greater than 150 ug/m^3. The 24-hour standard is attained when the expected number of days with levels above 150 ug/m^3 (average over a three year period) is less than or equal to one. Attainment of the annual PM_{10} standard is achieved when the annual arithmetic mean PM_{10} concentration over a three-year period is equal to or less than 50 ug/m^3 [40 CFR 50.6 (a) and (b)].

d) A maintenance plan with contingency measures has been fully approved under Section 175A.

This document is the PM_{10} maintenance plan for the Yuma area. The contingency measures for Yuma are contained in Chapter 7. ADEQ has every expectation that EPA Region IX will fully approve this maintenance plan when submitted to EPA in the spring of 2006.

e) The State has met all applicable requirements for the area under Section 110 and Part D.

ADEQ's fulfillment of these requirements are described in detail in Section 1.0 of Chapter 2 of this plan.

2.8 Applicable EPA Guidance

In the process of completing the maintenance plan for Yuma and fulfilling the requirements of a maintenance plan fully approvable by EPA, ADEQ referred to the guidance documents listed below:

a) PM_{10} SIP Development Guideline, U.S. Environmental Protection Agency, OAQPS, EPA-450/2-86-001, Research Triangle Park, NC, June 1987;

b) Procedures for Processing Requests to Redesignate Areas to Attainment, John Calcagni, Director, Air Quality Management Division, memorandum dated September 4, 1992;

c) PM_{10} Emission Inventory Requirements, U.S. Environmental Protection Agency, OAQPS, Research Triangle Park, NC, September 1994; and

d) Reasonable Further Progress, Attainment Demonstration, and Related Requirements for Ozone Nonattainment Areas Meeting the Ozone National Ambient Air Quality Standard, John S. Seitz, Director, Office of Air Quality Planning and Standards (MD-10), May 15, 1995.

2.9 Requirements for Nonattainment Areas that Have Attained the NAAQS

EPA's clean data policy applies to ozone nonattainment areas that are meeting the ozone NAAQS. Specifically, EPA waives certain requirements under CAA Section 172(c), including developing attainment demonstrations and reasonable further progress (RFP) demonstrations, for these nonattainment areas. If these areas have not had any violations of the ozone NAAQS for three consecutive years, as demonstrated through monitoring data, EPA deems these areas to have already attained the NAAQS and to have met RFP.[7] EPA also applies this "clean data policy" to PM_{10} nonattainment areas with simple PM_{10} problems, such as those dominated by fugitive dust problems and residential wood combustion. Under this policy, the PM_{10} nonattainment areas are not required to develop an attainment demonstration and RFP. The Yuma nonattainment area and this SIP meets all the requirements of this policy:

1. The area must be attaining the PM_{10} NAAQS based on the three most recent years of quality assured monitored air quality data.

Chapter 3 reveals that the Yuma monitoring site during the period of 2002–2004 showed one measured exceedance (170 ug/m^3) of the 24-hour PM_{10} NAAQS, due to a natural wind event in the Yuma area. ADEQ flagged this event pursuant to EPA's Natural Events Policy (NEP) and Arizona's Natural and Exceptional Events Policy (NEAP) 0159.000 and EPA concurred. Consequently, this reading has been excluded from the attainment calculation for Yuma. Review of the 24-hour averages for calendar years 2002, 2003, and 2004 reveals that the highest 24-hour average was 127 ug/m^3; review of the annual standard reveals that the 3-year annual average was 43.4 ug/m^3. Thus, the Yuma area also attained the annual PM_{10} NAAQS.

2. The State must continue to operate an appropriate PM_{10} air quality monitoring network, in accordance with 40 CFR Part 58, in order to verify the attainment status of the area.

The State continues to operate the Yuma monitoring network, in accordance with 40 CFR Part 58, in order to verify the attainment status of the area. The Yuma monitoring network is described in Chapter 3 of this plan.

3. The control measures for the area, which were responsible for bringing the area into attainment, must be approved by EPA as meeting reasonably available control measures (RACMs) and reasonably available control technology (RACT) requirements.

The control measures for the area, which were responsible for bringing the area into attainment, are described in Chapter 6 of this plan. The State anticipates that EPA will

[7] *Reasonable Further Progress, Attainment Demonstration, and Related Requirements for Ozone Nonattainment Areas Meeting the Ozone National Ambient Air Quality Standard*, John S. Seitz, Director, Air Quality Planning and Standards (MD-10), memorandum dated May 25, 1995, page 3.

approve these measures as meeting RACM and RACT requirements. In addition, the BACM developed for the Natural Events Action Plan (NEAP) are included in Chapter 6.

4. An emissions inventory must be completed for the area.

An emissions inventory has been completed for the Yuma area, and a detailed description is contained in Chapter 4 of this plan.

5. EPA must make a finding that the area attained the 24-hour and annual PM_{10} NAAQS.

PM_{10} concentrations reported at the Yuma monitoring site between 2002 and 2004 showed no measured exceedance of the 24-hour PM_{10} NAAQS, other than the flagged exceedance with which EPA concurred. Thus, the three-year average was less than one exceedance per year, which demonstrates Yuma attained the 24-hour PM_{10} NAAQS. The highest 24-hour reading was 127 ug/m^3, well below the 150 ug/m^3 24-hour NAAQS. Review of the annual standard for calendar years 2002, 2003, and 2004 reveals that the 3-year annual average was 43.4 ug/m^3; thus, the Yuma area also attained the annual PM_{10} NAAQS. Based on these clean data for 2002–2004, ADEQ requests that EPA make the finding that the Yuma area has attained the 24-hour and annual PM_{10} NAAQS.

Pursuant to its Clean Data Policy, Region IX has prepared a clean data finding for the years 1998 – 2000 for publication in the Federal Register in March 2006.

ADEQ also anticipates that Region IX will make a clean air finding for the timeframe beginning with 2001 to the present. ADEQ and Yuma area stakeholders developed a NEAP for the high wind event of August 18, 2002; Region IX concurred with the NEAP. Consequently, the anticipated clean data finding, the NEAP, and the anticipated clean air finding all serve to document clean air in the Yuma area since at least 1998.

In addition to these requirements, any requirements that are connected solely to designation or classification, such as new source review (NSR) and RACM/RACT, must remain in effect. Chapter 6 includes a description of RACMs implemented in the Yuma area to control PM_{10} emissions. It also contains a description of BACMs included in the Yuma NEAP. Chapter 7 contains the State's commitment to enforce NSR and RACM/RACT. However, the requirement under CAA Section 172(c) for reasonable further progress (RFP) demonstrations is waived due to the fact that the Yuma area has already attained the PM_{10} NAAQS and met RFP as demonstrated in recent monitoring readings. Finally, transportation and general conformity requirements continue to apply in the Yuma area. The use of the clean data policy does not constitute a CAA Section 107(d) redesignation, but only serves to approve nonattainment area SIPs required under Part D of the CAA.

2.10 Clean Air Act Requirements for Maintenance Plans

Section 107(d)(3)(E) of the CAA stipulates that for an area to be redesignated, EPA must fully approve a maintenance plan that meets the requirements of Section 175A. Section 175A defines the general requirements of a maintenance plan. These requirements are as follows:

1. The maintenance plan is a SIP revision.

The maintenance plan must provide for maintenance of the relevant NAAQS in the area for at least ten years after redesignation. Chapter 6 demonstrates that the control measures in place in the Yuma area are adequate to maintain the PM_{10} NAAQS until the out-year 2016.

2. The maintenance plan shall contain additional control measures necessary to ensure maintenance of the PM_{10} NAAQS.

Section 175A of the CAA states that the maintenance plan shall contain additional measures, if necessary, to ensure maintenance of the relevant NAAQS for ten years after redesignation. The control measures in Chapter 6 of this plan demonstrate that no additional control measures are needed. The control measures already being implemented in the Yuma area are adequate to ensure maintenance of the PM_{10} NAAQS until 2016.

3. The maintenance plan must be revised eight years after redesignation.

Section 175A also requires that the state submit a revision of the maintenance plan eight years after the original redesignation request is approved to provide for the maintenance of the NAAQS for an additional ten years following the first 10-year period. ADEQ commits to revise this maintenance plan in Chapter 7.

4. The maintenance plan must contain contingency measures.

The maintenance plan must contain contingency measures to ensure prompt correction of any violation of the NAAQS. At a minimum, the contingency measures must include a requirement that the State will implement all measures contained in the nonattainment SIP prior to redesignation. Activating the contingency plan as a result of a violation of the NAAQS will not necessitate a revision of the SIP unless required by the EPA Region IX Administrator. Chapter 7 describes the contingency measures contained in this maintenance plan and the trigger for them.

5. Core Provisions

In addition to the requirements listed above, the maintenance plan should contain core provisions that will be necessary to ensure maintenance of the relevant NAAQS in the area seeking redesignation from nonattainment to attainment.

a. The state should develop an attainment emissions inventory.

EPA has made a clean data finding for Yuma. As a result of this finding, ADEQ is not required to develop an attainment emissions inventory for the Yuma area.

b. The state should make a maintenance demonstration.

The state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of the relevant pollutant will not exceed the level of the attainment inventory or by modeling to show that the future mix of sources and emission rates will not cause a violation of the NAAQS. The demonstration should be for a period of ten years following the redesignation. This demonstration is made in Chapter 5.

c. The state should continue to operate its monitoring network.

Once an area has been redesignated, the state should continue to operate an appropriate air quality monitoring network, in accordance with 40 CFR Part 58, to verify the attainment status of the area. The maintenance plan should contain provisions for continued operation of air quality monitors that will provide such verification. ADEQ commits to operate the air quality monitor on a continual basis in the Yuma area in Chapter 7.

d. The state should verify continued attainment.

The state should ensure that it has the legal authority to implement and enforce all measures necessary to attain and to maintain the NAAQS. A.R.S. § 49-404 and A.R.S. § 49-406 provide this authority to Arizona.

e. The state should develop and be ready to implement a contingency plan.

Section 175A of the CAA requires that a maintenance plan include contingency provisions, as necessary, to promptly correct any violation of the NAAQS that occurs after redesignation of the area. These contingency measures are different than those generally required for nonattainment areas under Section172(c)(9). For the purposes of Section 175A, the contingency measures do not have to be fully adopted in order for the maintenance plan to be approved. Chapter 7 describes the contingency measures to be implemented in the Yuma area, if the need arises.

2.11 NEAP Policies and Requirements

In addition to CAA requirements, NEP policy requirements must also be fulfilled in the Yuma area. The following section goes into the specific requirements as they related to the Yuma area.

2.11.1 Overview

High wind events, like the event that occurred in Yuma on August 18, 2002, are a type of natural event covered by EPA's NEP (Areas Affected by PM-10 Natural Events, Memorandum, 1996, Mary D. Nichols). The NEP required ADEQ to submit a NEAP to

EPA by February 18, 2004, or eighteen months after the exceedance. ADEQ worked with local governments and stakeholders to develop the Yuma NEAP, including the identification of and commitment to implement best available control measures (BACM) to satisfy the requirements for abating sources of dust. The deadline for full implementation of control measures was August 18, 2005.

2.11.2 EPA Natural Events Policy

On May 30, 1996, EPA issued the NEP in a memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation. This memorandum announced EPA's new policy for protecting public health in all areas where the PM_{10} standard is violated due to natural events. Under this policy, EPA stated that, under certain circumstances, it is appropriate to exclude PM_{10} air quality data that are attributable to uncontrollable natural events from the decisions regarding an area's nonattainment status.

EPA's NEP sets forth the requirements for high PM_{10} concentrations caused by natural events. Under this policy, three categories of natural events are identified as affecting the PM_{10} levels: 1) volcanic and seismic activity; 2) wildland fires; and 3) high wind events such as the one that has precipitated this NEAP. The NEP defines high wind events as follows:

> "High Winds: Ambient PM_{10} concentrations due to dust raised by unusually high winds will be treated as due to uncontrollable natural events under the following conditions: (1) the dust originated from nonanthropogenic sources, or (2) the dust originated from anthropogenic sources controlled with best available control measures (BACM)."

2.11.3 Natural Events Action Plan Requirements

In the event of a PM_{10} violation of the NAAQS caused by a natural event in a moderate PM_{10} nonattainment area, the state can develop and submit to EPA a plan of action to address future events. The following is a summary of the EPA guidance regarding development of a NEAP as provided in the NEP. The NEAP should:

1) Include documentation and analysis of the event showing a clear causal relationship between the measured exceedance and the natural event. Documentation of natural events and their impact on measured air quality should be made available to the public for review.

2) Be developed in conjunction with the stakeholders affected by the plan.

3) Identify, study, and implement practical mitigating measures as necessary. The NEAP may include commitments to conduct pilot tests of new emission reduction techniques. The NEAP must contain a timely schedule for conducting such studies. A state has eighteen months after the submittal of the NEAP to EPA to implement measures that are technologically and economically feasible.

4) Include programs that abate or minimize appropriate contributing controllable sources of PM_{10}. Programs to minimize PM_{10} emissions may include application of BACM to any sources of soil that have been disturbed by anthropogenic activities. The state has eighteen months after the submittal of the NEAP to EPA to implement these BACM. The Yuma area BACM were implemented within this timeframe. ADEQ documented the BACM in a NEAP implementation report. ADEQ sent the report to EPA on February 17, 2005.

5) Establish public notification and education programs. The public notification and education program in the Yuma area is designed to educate the public about the short-term and long-term harmful effects that high concentrations of PM_{10} could have on their health and inform them that: (a) certain types of natural events affect the air quality of the area periodically; (b) a natural event is imminent; and (c) specific actions are being taken to minimize the health impacts of events.

6) Include programs that help minimize public exposure to unhealthy concentrations of PM_{10} due to future natural events.

7) Be made available for public review and comment.

8) Be submitted to EPA for review and comment.

9) Commit the State to periodically reevaluate: (a) the conditions causing violations of a PM_{10} NAAQS in the area; (b) the status of implementation of the NEAP; and (c) the adequacy of the actions being implemented. ADEQ will reevaluate the Yuma NEAP every five years and make appropriate changes to the plan.

Under the NEP, ADEQ developed and submitted a Natural Events Action Plan (NEAP) to EPA on February 17, 2004. The NEAP contains strategies that are currently being implemented by the local jurisdictions in the Yuma area to reduce particulates in the event of future high wind conditions in the Yuma area. The NEP states that best available control measures (BACM) must be implemented for contributing sources of PM_{10} within 3 years after the first NAAQS violation attributed to high wind events. Consequently, ADEQ completed a report on the implementation of the BACM contained in the Yuma NEAP. ADEQ submitted the NEAP implementation report to EPA on February 17, 2005.

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3.0 AIR QUALITY MONITORING FOR YUMA AREA

The primary goal of monitoring in the Yuma/Somerton area is to collect the necessary data to ensure the maintenance area remains in compliance with the primary PM_{10} NAAQS. Toward that goal, the objective of monitoring in the Yuma Valley is to fulfill the regulatory requirements for PM10 monitoring throughout the 10-year maintenance period.

ADEQ established the Yuma County Juvenile Center monitoring site in February 1988, to assess particulate concentrations in the Yuma area. The monitoring site has been designated the state and local air monitoring station (SLAM) site, neighborhood scale for population exposure. SLAMS sites are established by ADEQ to fulfill requirements of Section 110(a)(2)(B) of the CAA. ADEQ is required to monitor, compile, and analyze PM_{10} monitoring data on the ambient air quality of Yuma. The Yuma PM_{10} monitoring site is designed to measure concentrations in an area of population density. The Yuma sample frequency is every 6th day. The sample duration is 24 hours starting at 12:01am (midnight). The national 1 in 6 schedule is set by EPA.

3.1 Quality Assurance Procedures for Air Quality Monitoring

In Yuma, PM_{10} monitoring is conducted under the Final Draft Quality Assurance Project Plan for the Air Assessment Section, dated November 9, 2001. PM_{10} samples are collected with a dichotomous air monitor, using an EPA equivalent method designation.[1] An electrically powered air sampler draws ambient air at a constant volumetric flow rate, controlled by a microprocessor, into a specially shaped inlet where the suspended particulate matter in the PM_{10} size range is separated for collection on a 47mm polytetrafluoroethylene (PTFE) filter.

Each filter is weighed at the ADEQ Filter Lab in Phoenix (after moisture and temperature equilibration) before and after sample collection to determine the net weight (mass) gain due to collected PM_{10}. The lab is maintained at EPA-specified conditions. The total volume of air sampled is determined by the sampler from the measured flow rate at actual ambient temperature and pressure and the sampling time. The mass concentration of PM_{10} in the ambient air is computed as the total mass of collected particles in the PM_{10} size range divided by the actual volume of air sampled, and is expressed in micrograms per actual cubic meter of air.

The data are reviewed using the three-level quality system before receiving final validation. These data are then formatted, summarized into the appropriate quarterly or annual averages, and reported to the ADEQ air assessment ambient database (AAAD) and the EPA Air Quality System (AQS) database. The air sampler is operated in accordance with applicable CFR requirements and quality assurance guidance. Regular

[1] Equivalent method means a method for measuring the concentration of an air pollutant in the ambient air that has been designated as an equivalent method in accordance to 40 CFR Part 53 Subpart A; it does not include a method for which an equivalent method designation has been canceled in accordance with § 53.11 or § 53.16.

checks of the stability, reproducibility, precision, and accuracy of the samplers and laboratory procedures are conducted by ADEQ.

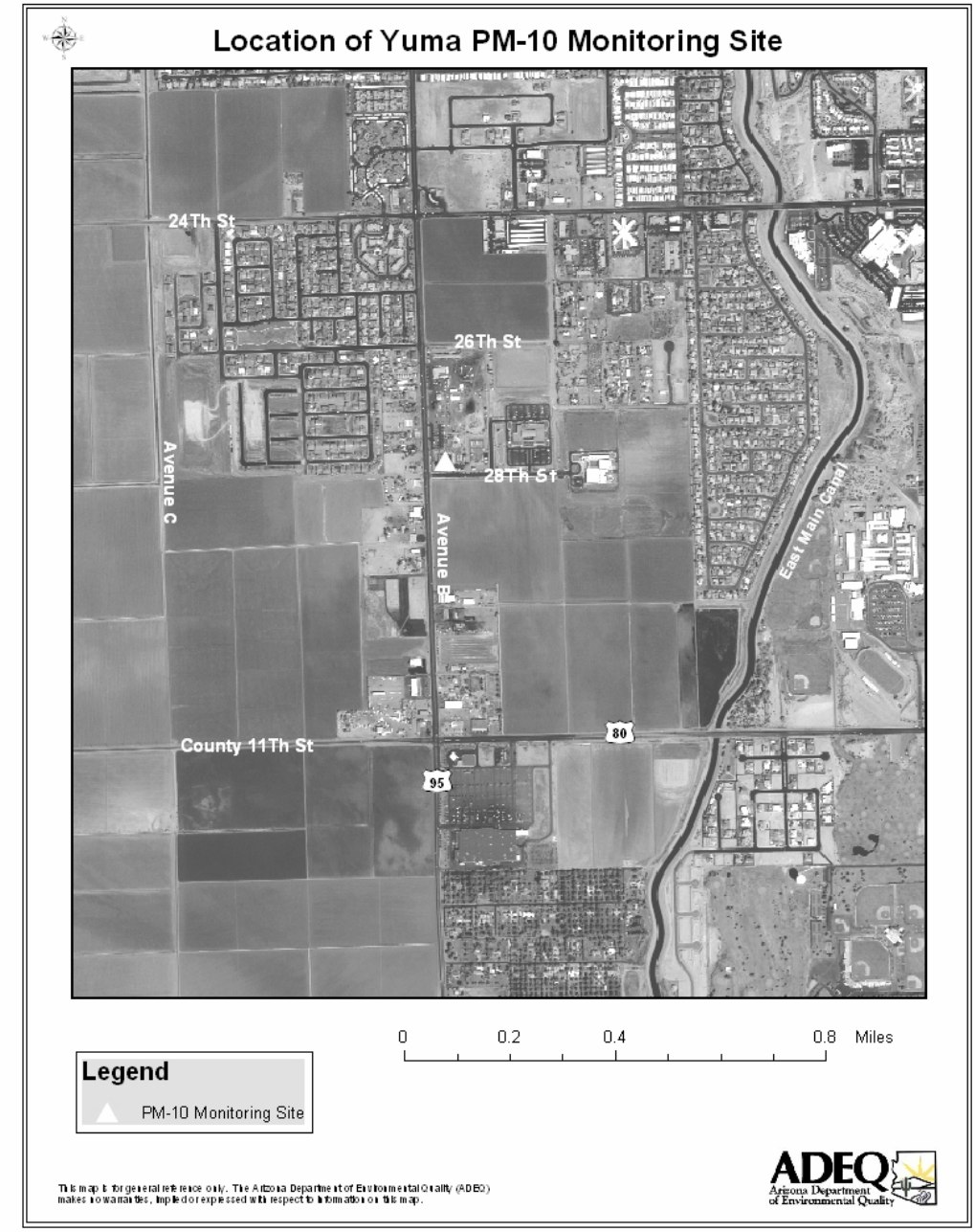
The initial location of the Yuma monitor, method, and parameters measured are detailed below in Table 3-1. Figure 3-1 shows the location of the Juvenile Center Monitoring Site in Yuma. The dichot samplers were moved from the Yuma Juvenile Center Monitoring Site to the Yuma County Courthouse Monitoring Site on June 13, 2002. Both dichots were replaced with one partisol sampler on August 6, 2002. A second Partisol sampler was added at the Yuma County Courthouse Monitoring Site for precision and accuracy on July 2, 2004.

Table 3-1. Parameters of the Yuma Monitoring Sites

Site Address	Began Operating	Latitude	Longitude	Type of Device	Parameters Measured	Classification	Scale	Objective
2795 Ave. B, Yuma, AZ	1988	32° 40'	114° 39'	Dichotomous Sampler	PM_{10}	State and Local Air Monitoring Station	neighborhood	general population exposure
2440 W. 28th St., Yuma, AZ	2002	32° 40'	114° 38'		Filter based PM_{10} R&P 2000 (duplicate measurement for precision), continuous PM_{10} with BAM1020	State and Local Air Monitoring Station	neighborhood	population exposure

Source: Air Quality Division, Assessment Section, 2005

Figure 3-1


Location of Yuma PM-10 Monitoring Site
24Th St
26Th St
28Th St
Avenue C
Avenue B
East Main Canal
County 11Th St
80
95
0
0.2
0.4
0.8 Miles
Legend
PM-10 Monitoring Site
This map is for general reference only. The Arizona Department of Environmental Quality (ADEQ) makes no warranties, implied or expressed with respect to information on this map.
ADEQ
Arizona Department of Environmental Quality

3.2 Monitoring and Precipitation

Precipitation can affect monitored PM_{10} levels. ADEQ obtained precipitation data for Yuma beginning with 1991 (see Table 3-2 below). As Table 3-2 reveals, annual rainfall for 1991 was below the 30-year average of 2.94 inches, but rose appreciably higher than the average through 1992 to 5.38 inches in 1993. From 1993, the annual precipitation continued to decrease to 0.34 inches in 1996. Rainfall increased to an all time high in 1997 when Yuma received 7.96 inches of rain. Then precipitation levels declined sharply until the year 2000 when the annual precipitation was only 1.62 inches. It increased to 3.48 inches in 2001. Yuma received the least amount of rainfall since 1991 in 2002 when the area only received 0.20 inches of rain for the entire year. Yuma had an usually wet year in 2004 when the total annual precipitation was 7.26 inches.

In spite of the fluctuations in annual precipitation, the Yuma area has experienced only one exceedance of the NAAQS, which does not count as a violation.

Table 3-2. Yuma Annual Precipitation, 1991 – 2004

	1991	1992	1993	1994	1995	1996	1997	1998
JAN	0.13	0.27	1.88	0.02	0.48	0.00	0.00	0.02
FEB	0.20	0.73	1.13	0.29	0.05	0.10	0.00	0.89
MAR	0.57	1.38	0.34	0.13	0.26	0.01	0.00	0.43
APR	0.00	0.13	0.00	0.00	0.17	0.00	0.00	0.02
MAY	0.00	0.27	0.01	0.28	0.00	0.00	0.00	0.01
JUN	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00
JUL	0.00	0.00	0.00	0.00	0.20	0.00	0.32	0.06
AUG	0.01	0.23	0.07	0.06	0.00	0.18	0.00	0.32
SEP	0.12	0.00	0.02	2.07	0.03	0.02	5.37	1.84
OCT	0.13	0.00	0.86	0.00	0.00	0.03	0.14	0.00
NOV	0.06	0.00	1.07	0.01	0.03	0.00	0.00	0.04
DEC	0.62	1.70	0.00	1.35	0.00	0.00	1.96	0.19
TOTAL	1.84	4.71	5.38	4.21	1.22	0.34	7.96	3.82

	1999	2000	2001	2002	2003	2004	Monthly Average
JAN	0.00	0.00	0.42	0.00	0.00	0.28	0.25
FEB	0.42	0.07	0.69	0.00	1.49	0.38	0.46
MAR	0.00	0.37	1.83	0.01	0.35	0.35	0.43
APR	1.19	0.00	0.12	0.00	0.04	0.03	0.12
MAY	0.00	0.00	0.00	0.00	0.00	0.00	0.04
JUN	0.03	0.00	0.00	0.00	0.00	0.00	0.01
JUL	0.36	0.00	0.18	0.00	0.59	0.00	0.12
AUG	0.04	1.15	0.10	0.00	0.51	0.98	0.26
SEP	0.20	0.00	0.00	0.08	0.18	1.07	0.79
OCT	0.00	0.03	0.12	0.09	0.00	1.88	0.23
NOV	0.00	0.00	0.01	0.02	0.41	0.47	0.15
DEC	0.00	0.00	0.01	0.00	0.03	1.82	0.55
TOTAL	2.24	1.62	3.48	0.2	0.44	7.26	0.28

SOURCE: Western Regional Climate Center, 2005

3.3 Monitoring Data -- Yuma PM_{10} Concentrations in 1991 – 2004

Table 3-3 contains monitoring data for the Yuma area for 1991 to 2004. The 24-hour standard was exceeded at the Juvenile Center Monitoring Site twice in 1991 (229 and 188 $\mu g/m^3$) and once in 2002 (170 ug/m^3). The exceedances in 1991 were noteworthy because the Juvenile Center Monitoring Site was representative of the valley (lowest elevation inhabited area) and the active farming area. The annual standard has not been exceeded since 1990. Figure 3.2 is a diagram depicting the annual 24-hour highest and 2nd 24-hour highest PM_{10} concentrations in Yuma.

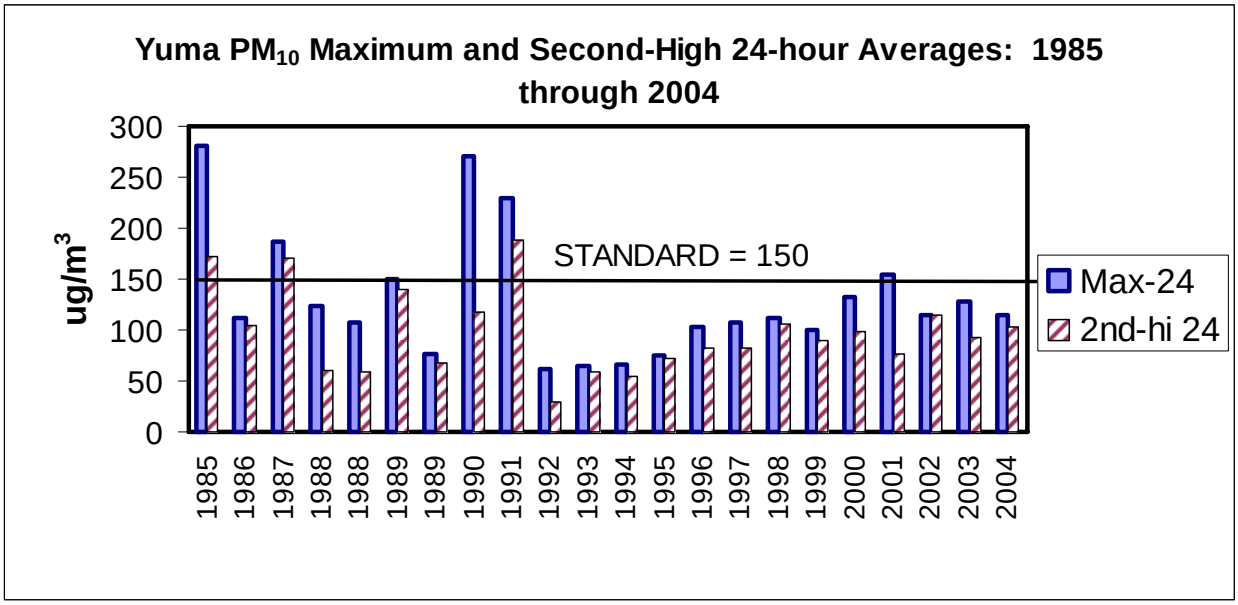
The exceedance of the 24-hr standard that occurred on August 18, 2002, was due to wind-generated dust event. An unusually large and intense thunderstorm developed in east-central Sonora, Mexico. By evening the thunderstorm had moved to the northwest through Yuma, producing sustained winds in excess of 25 miles per hour with gusts up to 45 miles per hour. Due to the high wind speeds, elevated concentrations of PM_{10} were experienced in Yuma. In the Imperial Valley, California and Baja California, Mexico, the average PM_{10} concentrations had values two to four times higher than those in Yuma. Other monitoring sites in the vicinity showed elevated concentrations as high as 700 ug/m^3 on a 24-hour basis.

Table 3-3. PM_{10} Data Summary for the Yuma Juvenile Center Monitor, 1991 – 2004

Year	24-hour High (ug/m^3)[1]	24-hour 2nd High (ug/m^3)	Number of Exceedances of 24-hour Standard	Annual Average (ug/m^3)[2]	Number of Exceedances of Annual Standard	Number of Samples
1991	229	188	2	48	0	48
1992	62	60	0	29	0	52
1993	65	59	0	31	0	47
1994	66	54	0	32	0	37
1995	75	72	0	35	0	47
1996	103	83	0	36	0	40
1997	108	83	0	36	0	34
1998	112	106	0	39	0	58
1999	100	90	0	37	0	56
2000	132	99	0	42.3	0	43
2001	150	77	0	40.6	0	27
2002	170[3]	125	0[3]	47.1	0	53
2003	127	93	0	38.0	0	58
2004	125	125	0	45.2	0	58

[1]24-hour average standard is 150 ug/m^3.
[2]Annual average standard is 50 ug/m^3.
[3]EPA concurred with the data being flagged, and a Natural Events Action Plan was submitted to EPA on February 17, 2004. A Natural Events Action Plan Implementation Report was submitted on August 17, 2005. Through these actions the 170 ug/m^3 was exempted; it does not appear in Figure 3-2.
SOURCE: Air Quality Division, Assessment Section, 2005

Figure 3-2. Annual High and 2nd-High 24-Hour PM_{10} Concentrations in Yuma



SOURCE: Air Quality Division, Assessment Section, 2005

PM_{10} concentrations reported at the Juvenile Center monitoring site between 2000 and 2004, showed one exceedance of the 24-hour PM_{10} NAAQS (see Table 3.3), caused by a high wind event. However, according to EPA's Natural Events Policy (NEP), this measurement does not count as a violation. Consequently, the three-year average number of exceedances was less than 1.0, which indicates Yuma attained the 24-hour PM_{10} NAAQS. Review of the annual standard for calendar years 2002, 2003, and 2004 reveals that the 3-year annual average was 43.4 ug/m^3. The design value is 87 percent of the annual standard. Yuma air quality did not violate the annual standard for the three-year period from 2002 through 2004. Thus, the Yuma area attained the annual PM_{10} NAAQS.

Based on the most recent three years of air quality data, the 24-hour average design value for the Yuma area is 127 ug/m^3. The design value is 85 percent of the 24-hour standard. This plan demonstrates that the control measures modeled to reduce the 24-hour design value will concomittantly reduce the annual design value.

The attainment demonstration was modeled for seven design dates in 1999, with concentrations ranging from 19 to 102 ug/m^3. ADEQ believes that the control measures modeled to reduce the 24-hour design value will concomitantly reduce the annual design value.

Table 3.4 presents summary monitoring data for the Yuma Nonattainment Area for the 2002-2004 timeframe.

Table 3-4. 2002 - 2004 PM_{10} SUMMARY STATISTICS FOR THE YUMA NONATTAINMENT AREA
PM_{10} Concentrations are for Standard Conditions and are in ug/m^3

2002			2003			2004		
Date	Original	Duplicate	Date	Original	Duplicate	Date	Original	Duplicate
			12/29/03	0[a]		12/23/04	52	37
						12/29/04	23	23
Average Q1	53.8	<75%		30.9			32.2	
Average Q2	60.6	67.5		45.0			61.8	
Average Q3	38.3	<75%		33.8			55.4	
Average Q4	35.7			42.4			31.6	
Average (year)	47.1			38.0			45.2	
Std. Dev.	29.87	43.77		21.87			30.72	
N Samples	53	24		58			58	
Minimum	2	17		10			2	
Maximum	125	212		127			125	90
2nd high	115	116		93			125	66
3rd high	113	111		80			125	59
4th high	111	111		71			125	57
5th high	101	96		65			114	55

[a] The December 29, 2003 value of 0 was set to "no data". It's unreasonable to suppose the PM_{10} concentrations averaged for 24 hours in southwest Arizona would be lower than 5 ug/m^3. Consequently, the zero value was set to "no data".

No collocated samples were taken from 8/6/2002 through 7/1/2004.

SOURCE: Yuma Maintenance Plan Technical Support Document Demonstration of Attainment, January 25, 2005

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4.0 YUMA AREA EMISSIONS INVENTORY

In order to develop control measures for the sources of PM_{10} in the Yuma Valley, ADEQ had to identify the significant sources of PM_{10} in the Yuma area. This chapter describes the local data and emission estimation methods used to develop 1999 and 2016 PM_{10} emission estimates for Yuma.

E. H. Pechan & Associates Inc. (Pechan), a consulting firm, was hired by ADEQ to develop the PM_{10} source inventory for Yuma[1]. The starting point for the 1999 inventory preparation was Version 1.0 of EPA's National Emissions Inventory (NEI), which contains PM_{10} emission estimates for Yuma County. The projection year of 2016 was selected to meet the EPA requirement that there be a maintenance plan demonstrating that the PM_{10} NAAQS will still be met 10 years after the area is redesignated as an attainment area by EPA.

For most source categories, this chapter describes emission estimates only for the Yuma County portion of the Yuma Study Area, which includes portions of Imperial County, California and Baja California Norte, Mexico (Figure 4-1).

4.1 Wind-blown Dust

Wind-blown PM_{10} emissions were calculated for the following land use categories: alluvial plain and channels, agricultural crop lands, agricultural unpaved roads, native desert, urban disturbed areas, and miscellaneous disturbed areas (e.g., construction areas outside the City of Yuma). Emissions for the Imperial sand dunes were also assessed. No winds exceeding 30 mph were recorded by the Yuma Valley meteorological station in 1999. Hence, 1999 emissions for sand dunes were assumed to be negligible.

For agricultural lands, it was assumed that PM_{10} emissions are negligible during seasons when crops are present. Hence, emissions were only estimated during seasons when agricultural tilling occurs.

Table 4-1 provides Yuma Study Area acreage estimates for the land uses of interest (Sedlacek, 2002), as well as the emission factor types that were used to estimate PM_{10} emissions. ADEQ developed acreage estimates for the various types of land use with input from stakeholders. Hence, emission estimates were developed for the entire Yuma Study Area, not just Yuma County. Fallow agricultural acreage by season was assumed to be the same in the Imperial County and Mexico portions of the Study Area. For unpaved agricultural roads, ADEQ sampled several areas throughout the Study Area from satellite imagery to derive a factor (0.0815) to estimate the portion of agricultural land that was unpaved roads versus crop land.

A specific land use category for Urban Disturbed Areas (Code 295) was created to estimate emissions within the urbanized portions of the City of Yuma. This specific category allowed for more accurate characterization of the reductions in emissions associated with the 2013 (the original out-year for the maintenance period) reduction in

1 The complete inventory is presented in Appendix A of the Yuma Maintenance Plan Technical Support Document.

disturbed area acres within the City of Yuma. This same 2013 reduction in disturbed area was assumed to be representative of 2016.

Figure 4-1. Yuma Study Area

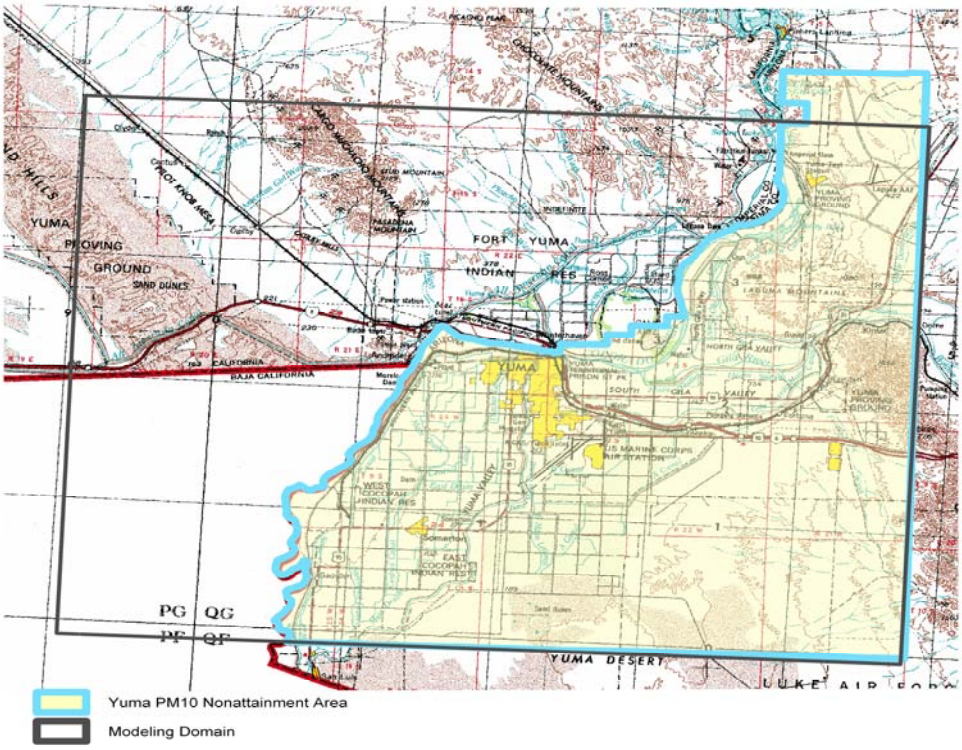

Table 4-1. 1999 Yuma Study Area Acreage Estimates by Land Use Category and Emission Factor Type

Land Use Category	Land Use Code	Acres	Emission Factor Type
Alluvial Plain and Channels	**440**	**141,227**	**Stabilized Land**
Native Desert	**390**	**74,252**	**Native Desert**
Fallow Agricultural Fields	**260**	**181,000**[2]	**Disturbed Vacant**
Unpaved Ag Roads	**260**	**16,798**	**Disturbed Vacant**
Urban Disturbed Areas	**295**	**4,125**	**Disturbed Vacant**
Miscellaneous Disturbed Areas	**290**	**25,770**	**Disturbed Vacant**

SOURCE: E. H. Pechan and Associates, Inc., 2004

Table 4-2 contains the 1999 emission estimates for windblown dust for the Yuma Study Area. For native and stabilized lands, emissions are calculated using the number of wind events. This method is based on the assumption that after a short period of high winds on native and stabilized lands, most of the dust capable of being entrained by the wind has already been removed (i.e., the limited reservoir theory). Table 4-2 shows that the highest PM_{10} emissions in 1999 in the Yuma area occurred during the winter season with over 56,000 tons of emissions. Emissions during the fall followed at over 41,000 tons. Dust emissions during the spring of 1999 amounted to over 25,000 tons. Emissions of PM_{10} were the lowest during the summer season at around 6,800 tons.

[2] The corrected number of fallow (vacant) agricultural acres in the Yuma Nonattainment Area is 14,000. The estimate of 181,000 acres for fallow agricultural land comes directly from the contractor's emission inventory report, reprinted in the Technical Support Document as Appendix A. On page 7 of the report, the authors state that because "vacant agricultural land varies by season, the total acreage of agricultural land was multiplied by the following percentages: fall = 35%, winter = 40%, spring = 10%, and summer = 10%. The windblown emissions from this acreage went into the air quality model.

In later discussions with the Yuma farming community, it became obvious that this estimate was several times too large. Based on Yuma area farming practices, this estimate was reduced by 90%, which yielded a "vacant (or fallow) field acreage" of 14,000 acres in the nonattainment area on an annual basis. More discussion of this subject can be found in Appendix C in the Technical Support Document.

The over estimation of windblown emissions based on the 181,000 acres contributed to the model's over estimation of measured particulates concentrations on March 31, 1999. But because it was an over estimate, and because compliance with the standards was demonstrated, it is not necessary to redo the air quality modeling.

Table 4-2. 1999 Yuma Study Area PM_{10} Emission Estimates for Windblown Dust

		Emissions by Season (tons)				
Land Use Category	Acres	Fall	Winter	Spring	Summer	Total Annual (PM_{10} tons)
Alluvial Plain and Channels	**141,227**	**463**	**926**	**771**	**356**	**2,517**
Native Desert	**74,252**	**191**	**191**	**0**	**0**	**382**
Fallow Agricultural Fields	**181,000**	**23,464**	**33,628**	**6,934**	**1,809**	**65,835**
Unpaved Agricultural Roads	**16,798**	**6,228**	**7,810**	**6,442**	**1,680**	**22,160**
Urban Disturbed Areas	**4,125**	**1,529**	**1,918**	**1,582**	**413**	**5,442**
Miscellaneous Disturbed Areas	**25,770**	**9,554**	**11,981**	**9,883**	**2,578**	**33,996**
	Totals	41,430	56,453	25,612	6,836	130,331

SOURCE: E. H. Pechan and Associates, Inc., 2004

Emission estimates for 2016 are provided in Table 4-3. It was assumed that the winds in 2016 would be similar to those observed in 1999. The only significant change in the activity data (acreage estimates) between 1999 and 2016 was the reduction of urban disturbed acreage; hence, the emission estimates for the entire Study Area are very similar. A small amount of agricultural land is lost to urban development in 2016.

Table 4-3. 2016 Yuma Study Area PM_{10} Emission Estimates for Windblown Dust

		Emissions by Season (tons)				
Land Use Category	**Acres**	**Fall**	**Winter**	**Spring**	**Summer**	**Total Annual (PM_{10} tons)**
Alluvial Plain and Channels	**141,227**	**463**	**926**	**771**	**356**	**2,517**
Native Desert	**74,252**	**191**	**191**	**0**	**0**	**382**
Fallow Agricultural Fields	**179,048**	**23,234**	**33,297**	**6,866**	**1,791**	**65,188**
Unpaved Agricultural Roads	**16,633**	**6,167**	**7,733**	**6,379**	**1,664**	**21,942**
Urban Disturbed Areas	**2,290**	**849**	**1,065**	**878**	**229**	**3,021**
Miscellaneous Disturbed Areas	**25,770**	**9,554**	**11,981**	**9,883**	**2,578**	**33,996**
	Totals	40,458	55,193	24,777	6,618	127,046

SOURCE: E. H. Pechan and Associates, Inc., 2004

In developing emissions for the unpaved roads in the Yuma area, unpaved road emissions were broken out into two subcategories: emissions from unpaved public roads and emissions from agricultural roads. The emissions for unpaved public roads is assumed to be 15% of the total

(i.e. 15% of the unpaved road travel occurs on unpaved public roads), while the remaining 85% of emissions occur from agricultural roads (Ramos, 2003).

Vehicle miles traveled (VMT) data and the mean vehicle speed were obtained from the PM_{10} emissions analysis conducted as part of the Yuma Metropolitan Planning Organization (YMPO) Model and Air Quality Conformity Analysis project. The report indicates that the 1999 unpaved road daily VMT, calculated using TransCAD GIS-based modeling software, is 98,864 miles (Lima & Associates, 2000). The projected daily unpaved road VMT for 2016 is 64,240 miles. This value was estimated by calculating the annual growth rate between 2013 and 2025 unpaved road VMT projections (Lima & Associates, 2002). This annual growth rate of 6.1 percent per year was then used to estimate three additional years of growth from 2013.

EPA's PART5 model was used to obtain the reentrained road dust, brake wear, and tire wear portions of the paved road emission factors (EPA, 1995) in the Yuma Study Area. As part of the PART5 output, the paved road reentrained road dust plus brake wear emission factors are available. These emission factors are shown in Table 4-4. Also, based on the PART5 output, the brake wear accounts for 0.013 grams per mile in all of the PART5 emission factors. Table 4-4 also shows the PART5 tire wear emission factor. This value does not change by road type or year. MOBILE6.1, another EPA model, was used to calculate 1999 and 2016 exhaust emission factors (EPA, 2002). The MOBILE6.1 exhaust emission factors account for Tier 2 emission standards and 2007 heavy duty emission standards that are not incorporated in PART5. These exhaust emission factors are shown in Table 4-4. However, MOBILE6.1 does not include reentrained road dust emission factors, while both PART5 and MOBILE6.1 use the same information for calculating brake wear and tire wear emission factors. Therefore, the PART5 emission factors for fugitive dust and brake and tire wear, and the MOBILE6.1 exhaust emission factors were used to calculate emission factors, because they are more representative of the 1999 and 2016 vehicle populations.

Daily VMT estimates were obtained from the PM_{10} emissions analysis prepared by Lima & Associates for the Arizona Department of Transportation (ADOT) and the YMPO (Lima & Associates, 2000). VMT for each roadway type was estimated using TransCAD GIS based modeling software. Lima & Associates projected 2013 and 2025 daily VMT on paved roads (Lima & Associates, 2002). Daily VMT estimates were not available for 2016 for this analysis. Therefore, the average annual growth rate was calculated for each road type from 2013 to 2025. Three years of growth at this annual growth rate were then applied to the 2013 VMT by road type to estimate 2016 average daily VMT on paved roads. The 1999, 2013, and 2025 VMT, as well as the calculated annual growth rates between 2013 and 2025, and the estimated 2016 VMT are all shown in Table 4-5.

Table 4-4. 1999 and 2016 PM_{10} Paved Road Emission Factors by Road Type

Roadway Type	Speed (mph)	Silt Loading (g/m^2)	AP-42 Equation, 1999 & 2016 (includes Reentrained Dust, Brake Wear, Tire Wear, and Exhaust)	PART5 1999 and 2016 Paved Road Reen-trained Dust plus Brake Wear Emission Factor (g/mi)	PART5 1999 and 2016 Tire Wear Emission Factor (g/mi)	1999 MOBILE6.1 PM_{10} Exhaust Emission Factor (g/mi)	2016 MOBILE6.1 PM_{10} Exhaust Emission Factor (g/mi)	1999 Total Paved Road PM_{10} Emission Factor (includes Reentrained Dust, Tire Wear, Brake Wear, and Exhaust)	2016 Total Paved Road PM_{10} Emission Factor (includes Reentrained Dust, Tire Wear, Brake Wear, and Exhaust)
Interstate	55	0.04	0.57	0.37	0.009	0.064	0.011	0.443	0.390
Principal Arterials	42	0.3	2.13	1.92	0.009	0.064	0.011	1.993	1.940
Minor Arterials	40	0.3	2.13	1.92	0.009	0.064	0.011	1.993	1.940
Rural Major Collectors	45	0.7	3.69	3.49	0.009	0.064	0.011	3.563	3.510
Rural Minor Collectors	46	0.7	3.69	3.49	0.009	0.064	0.011	3.563	3.510
Urban Collectors	35	0.24	1.84	1.64	0.009	0.064	0.011	1.713	1.660
Local Roads	35	0.85	4.19	3.98	0.009	0.065	0.011	4.054	4.000
Interstate Ramps	35	0.04	0.57	0.37	0.009	0.064	0.011	0.443	0.390
Local	20	0.85	4.19	3.98	0.009	0.065	0.011	4.054	4.000

NOTES: Emission factors are in grams per mile.

SOURCE: E. H. Pechan and Associates, Inc., 2004

As with unpaved roads, the paved road reentrained dust emission factors were corrected for the effects of precipitation. Only the fugitive dust portion of the emission factor was adjusted for precipitation effects. No adjustments were applied to the brake wear, tire wear, or exhaust portions of the emission factors.

4.1.1 Road Construction Emissions

Construction emissions are estimated using two basic construction parameters, the acres of land disturbed by the construction activity and the duration of the activity. Data on the actual acres disturbed by road construction are generally not available, so a surrogate is used. The 1999 NEI emission estimation methods for road construction use the following miles to acres conversions by roadway type:

Interstate, urban and rural; Other arterial, urban – 15.2 acres/mile
Other arterial, rural – 12.7 acres/mile
Collectors, urban – 9.8 acres/mile
Collectors, rural – 7.9 acres/mile

Table 4-5. 1999 and 2016 Daily VMT by Road Type

Road Type	1999 Daily VMT (miles per day)	2013 Daily VMT (miles per day)	2025 Daily VMT (miles per day)	Average Annual Growth Rate from 2013 to 2025	Estimated 2016 Daily VMT (miles per day)
Interstate	**541,163**	**866,379**	**986,872**	**1.09%**	**895,048**
Principal Arterials	**860,715**	**1,564,166**	**1,768,187**	**1.03%**	**1,612,851**
Minor Arterials	**672,408**	**1,137,824**	**1,443,793**	**2.00%**	**1,207,626**
Rural Major Collectors	**91,129**	**198,520**	**289,087**	**3.18%**	**218,077**
Rural Minor Collectors	**448,640**	**870,923**	**1,028,207**	**1.39%**	**907,831**
Urban Collectors	**139,709**	**232,904**	**271,676**	**1.29%**	**242,045**
Local Roads	**4,841**	**17,387**	**21,204**	**1.67%**	**18,271**
Interstate Ramps	**50,581**	**84,437**	**94,825**	**0.97%**	**86,922**
Local Paved	**889,680**	**1,361,490**	**1,678,386**	**1.76%**	**1,434,610**
Total	3,698,866	6,334,030	7,582,237		6,623,281

SOURCES:The 1999 Daily VMT estimates are from Lima & Associates, 2000. The 2013 and 2025 Daily VMT estimates are from Lima & Associates, 2002.

The number of miles of highway constructed in 1999 and 2013 projections were provided by local officials. Activity in 2016 is assumed to be equivalent to the 2013 projected activity (see Table 4-6). The type of roadways constructed was not available; therefore, 9.8 acres/mile was assumed for all roads.

Table 4-6. 1999 and 2016 Miles of Roadway Constructed and PM_{10} Emissions

Location	1999 Miles of Roadway Constructed	1999 Emissions (tons)	2016 Miles of Roadway Constructed	2016 Emissions (tons)
Somerton	**2.52**	**1,383**	**0**	**0**
City of Yuma	**7.2**	**3,951**	**11.1**	**6,092**
Yuma Co.	**1.9**	**384**	**3.6**	**2,634**
ADOT	**0.7**	**1,043**	**4.8**	**1,976**
Total		6,761		10,702

SOURCE: E. H. Pechan and Associates, Inc., 2004

Emissions were calculated using the total acres disturbed, the PM_{10} emission factor of 0.42 tons/acre/month, and the activity duration, estimated to be 12 months. Adjustments were made to the PM_{10} emissions to account for conditions in Yuma including correction parameters for soil moisture level and silt content (MRI, 1999).

Soil moisture levels were estimated using precipitation-evaporation values from Thornthwaite's PE Index. The PE value for Yuma County is 6. A silt content value of 40 percent was used. This value was used to calculate 1999 NEI emissions for Yuma County and was determined by comparing the U.S. Department of Agriculture surface soil map with the county map.

4.1.2 General Building Construction Emissions

This emissions category includes PM_{10} emissions from residential building (housing) construction and commercial building construction. Housing construction PM_{10} emissions were calculated using an emission factor of 0.032 tons PM_{10}/acre/month, the number of housing units constructed, a units-to-acres conversion factor, and the duration of construction activity. The duration of construction activity is assumed to be 6 months (MRI, 1999).

Apartment construction emissions were computed separately using an emission factor that is more representative of emissions from apartment building construction (0.11 tons PM_{10}/acre/month). A 12-month duration is assumed for apartment construction. The same emission factor and duration were used for warehouse construction.

The total acres disturbed by construction is estimated by applying conversion factors to the housing start data for each category as follows:

Single family - 1/4 acre/building
Two family - 1/3 acre/building
Apartment - ½ acre/building or 1/20 acre/unit

These conversion factors were used unless they were larger than 1999 average lot sizes reported by local officials. Average lot size was used for all Yuma County buildings and City of Yuma single family houses and duplexes. The warehouse average lot size of 7 acres provided by the City of Yuma seemed excessively large, and there were no acres per building conversion factors available for warehouses. Therefore, the average warehouse lot size provided by Yuma County was also used for the 8 warehouses constructed in the City of Yuma.

The number of single-family, two-family, and apartment buildings and warehouses constructed in 1999 and 2013 projections were provided by Somerton, Yuma, and Yuma County officials. The data provided by Somerton combined single-family and two-family data; therefore, all units were assumed to be single-family buildings. The number of single family houses, duplexes, and warehouses constructed in 1999 and 2013 projections and the acre/unit used for each is shown in Table 4-7. Activity in the 2016 projection year is assumed to be the same as projected for 2013. The 1999 and 2016 emission estimates in tons per year (tpy) for building construction are given in Table 4-8.

Table 4-7. 1999 and 2013 Housing Starts and Acres/Unit Conversions

		1999		2013	
Unit Type		No. of Units	Acres/Unit	No. of Units	Acres/Unit
Yuma Co.	**single family**	**370**	**0.25**	**370**	**0.25**
	warehouses	**8**	**1.30**	**8**	**1.30**
City of Yuma	**single family**	**251**	**0.184**	**1533**	**0.184**
	duplex	**2**	**0.184**	**6**	**0.184**
	apartment	**44**	**0.05**	**111**	**0.05**
	warehouses	**8**	**1.30**	**7**	**1.30**
Somerton	**single family**	**393**	**0.25**	**393**	**0.25**
	apartment	**84**	**0.05**	**84**	**0.05**

SOURCE: E. H. Pechan and Associates, Inc., 2004

Table 4-8. 1999 and 2016 PM_{10} Emission Estimates for Building Construction

Area	Unit Type	1999 Emissions (tons)	2016 Emissions (tons)
Yuma Co.	**single family**	**11.1**	**11.1**
	warehouses	**14.8**	**14.8**
City of Yuma	**single family**	**5.51**	**33.8**
	duplex	**0.04**	**0.13**
	apartment	**1.82**	**9.16**
	warehouses	**14.8**	**13.0**
Somerton	**single family**	**3.24**	**3.24**
	apartment	**2.48**	**2.48**
Totals		53.8	87.7

SOURCE: E. H. Pechan and Associates, Inc., 2004

4.2 Aircraft Emissions

The basic method for estimating emissions for this category involves determining aircraft fleet make-up and level of activity and this is matched with the appropriate emission factors by aircraft type to estimate daily or annual emissions. Aircraft emission estimates focus on emissions that occur close enough to the ground to affect ground-level concentrations. Aircraft operations within this layer are defined as landing and takeoff (LTO) cycle. The five specific operating modes in an LTO are:

Approach
Taxi/idle-in
Taxi/idle-out
Takeoff
Climb-out

The following PM_{10} emission factors were used for calculating emissions (EPA, 1992):

Air Taxi: 0.60333 pounds/LTO
Military Aircraft: 0.60333 pounds/LTO

Air taxi refers to small aircraft used for scheduled service carrying passengers and/or freight.

LTO information was provided by the U.S. Border Patrol, the Marine Corps Air Station, the Yuma Proving Ground, and Yuma International Airport, shown in Table IV-21. The number of flights per day is expected to decrease at Yuma International Airport between 1999 and 2013 due to a decrease in the number of passengers to the Yuma market and the subsequent increased fares

to Yuma. The 2013 estimates provided by the sources above are assumed to be representative of 2016 activity.

Table 4-9. 1999 and 2016 LTO Data and Emission Estimates for Yuma Airports

Airport	1999 Daily LTOs	1999 Emissions (tons)	2016 Daily LTOs	2016 Emissions (tons)
U.S. Border Patrol	**2**	**0.22**	**6**	**0.66**
Marine Corp Air Station	**60**	**6.60**	**69**	**7.60**
Yuma Proving Ground	**54**	**5.95**	**54**	**5.95**
Yuma Intl. Airport	**25**	**2.75**	**20**	**2.20**
Total		15.5		16.4

SOURCE: E. H. Pechan and Associates, Inc., 2004

4.2.1 Unpaved Airstrips

PM_{10} emissions from unpaved airstrips were estimated using the same equation as was used for unpaved roads. The soil silt content and moisture content were assumed to be 3 percent and 1 percent, respectively. An average speed of 40 mph was used, and the length of one LTO was assumed to be 1 mile. The number of flights per week for the two unpaved airstrips in the Yuma nonattainment area, shown in Table 4-10, was provided by local officials. The number of LTOs estimated by these officials for 2013 is assumed to be representative of activity in 2016.

Table 4-10. 1999 and 2016 LTO Data and Emissions for Unpaved Airstrips

	1999			2016		
Airstrip	Flights per Week	Average Annual LTOs	Emission (lbs)	Flights per Week	Average Annual LTOs	Emission (lbs)
Somerton	**7-10**	**442**	**202**	**15**	**780**	**356**
Pierce Aviation	**70-80**	**3,900**	**1,781**	**70-80**	**3,900**	**1,781**
Total		4,342	1,982		4,680	2,137

SOURCE: E. H. Pechan and Associates, Inc., 2004

4.3 Stationary Sources

1999 PM_{10} emissions for 5 categories of stationary sources, shown in Table 4-11, were provided by ADEQ. Emissions for 2016 were calculated by applying growth factors to the 1999 emissions. The growth factors were based on industry sector constant dollar output projections

from Regional Economics Model, Inc. (REMI) economic models incorporated into Version 4.0 of the Economic Growth Analysis System (EGAS) (Pechan, 2001). Table 4-12 shows the 1999 and 2016 REMI data for each sector. The growth factors, the ratio of 2016 output to 1999 output, are also shown in Table 4-12. The growth factor for manufacturing stationary sources was calculated by summing the REMI data for REMI sectors 1 (lumber and wood products), 3 (stone, clay, and glass products), 16 (paper and allied products), and 18 (chemical and allied products).

Table 4-11. 1999 and 2016 PM_{10} Stationary Source Emissions

Sector	1999 Emissions (tons)	2016 Emissions (tons)
Support activities for agriculture	**10**	**14**
Utilities	**50**	**73**
Manufacturing	**6**	**11**
National Security	**1**	**1**
Rock Products	**10**	**20**
Total	77	119

SOURCE: E. H. Pechan and Associates, Inc., 2004

Table 4-12. 1999 and 2016 REMI Data and Growth Factors

Sector	REMI Sector	1999 REMI Data	2016 REMI Data	2016 Growth Factor
Support activities for agriculture	**49**	**0.656**	**0.893**	**1.361**
Utilities	**30**	**1.883**	**2.740**	**1.455**
Manufacturing	**1,3,16, and 18**	**3.839**	**10.267**	**1.877**
National Security	**52**	**4.608**	**4.800**	**1.042**
Rock Products	**3**	**1.631**	**3.291**	**2.018**

SOURCE: E. H. Pechan and Associates, Inc., 2004

4.4 Railroad Locomotives

The 1999 NEI estimates that railroad locomotives contribute 17 tpy of PM_{10} in the Yuma Nonattainment Area. Estimation methods are described in the Trends Procedures Document (EPA, 2001a). Future year activity changes affecting emission estimates are based on earnings projections for Railroad Transportation.

In January 1997, EPA proposed draft locomotive emission standards to control emissions of oxides of nitrogen, volatile organic compounds, carbon monoxide, PM, and smoke from newly manufactured and remanufactured diesel-powered locomotives and locomotive engines. In December 1997, EPA promulgated the locomotive emission standards (EPA, 1997). The locomotive standards are to be implemented in three phases, depending on the manufacture date. Tier 0 applies to the remanufacturing of locomotives and locomotive engines manufactured from 1973 through 2001. Tier I applies to the original manufacture and remanufacturing of locomotives and locomotive engines manufactured from 2002 through 2004. Tier II applies to the original manufacture and remanufacturing of locomotives and locomotive engines manufactured in 2005 and later. When fully phased-in by 2040, EPA estimates that the rule will achieve a 46 percent reduction in PM emissions. Emission estimates for 1999 and 2016 are shown in Table 4-13 below.

4.5 Summary of Stationary and Area Source Emissions for the Yuma Area

Table 4-13 summarizes the 1999 and 2016 PM_{10} emissions by source category developed by Pechan and Associates, Inc. for the Yuma area. These source categories are listed in the same order that they appear in this chapter. With the exception of windblown dust, the emission estimates summarized in Table 4-13 are for the Yuma County portion of the nonattainment area. In total, 2016 emissions are expected to be at the same level that they were in 1999. The largest PM_{10} emission reductions between 1999 and 2013 come from paving unpaved roads, and through reducing the acreage that is susceptible to windblown dust. These PM_{10} emission reductions are offset by increased PM_{10} emissions resulting from increased travel on paved roads and more road construction occurring in 2016 than in 1999. Agriculture-related PM_{10} emissions are expected to remain steady during the study period.

Table 4-13. Yuma PM_{10} Nonattainment Area Emissions Summary - 1999 and 2016

	1999 Annual Emissions (tons)	2016 Annual Emissions (tons)
Agricultural and Prescribed Burning	**40.7**	**34.1**
Agricultural Tilling	**3,572**	**3,572**
Agricultural Cultivation and Harvesting	**15.7**	**15.7**
Windblown Dust	**130,331**	**127,046**
Unpaved Roads - Re-entrained Dust	**10,183**	**5,537**
Paved Roads	**3,419**	**5,839**
Road Construction	**6,761**	**10,702**
General Building Construction	**53.8**	**87.7**
Aircraft	**15.5**	**16.4**
Unpaved Airstrips	**1.0**	**1.1**
Stationary Sources	**77**	**119**
Railroad Locomotives	**17**	**15**
Total	154,487	152,985

NOTES: With the exception of windblown dust, all emission estimates are for the Yuma County portion of the nonattainment area.

SOURCE: E. H. Pechan and Associates, Inc., 2004

4.6 Mobile Source Emissions Budgets

Mobile sources are also a source of PM_{10} emissions in the Yuma area. Their impact on the air quality of the Yuma area has to be assessed in the context of attaining the PM_{10} NAAQS and complying with the NAAQS throughout the maintenance period. Transportation conformity regulations in 40 CFR Part 93, Subpart A require that mobile source emissions budgets be calculated for the Yuma area. To this end, the Yuma Metropolitan Planning Organization and its contractor, Lima and Associates, Inc., have forecasted mobile source emissions in the Yuma area for 2004, 2008, and the maintenance year of 2016. Since these forecasts were not part of the area source and point source emissions inventory developed by Pechan and Associates, Inc, they are presented here in Tables 4-14, 4-15, and 4-16, respectively.

Table 4-14. Mobile Sources Emissions Data Used in the Calculation of the Mobile Source Emissions Budgets for the Yuma Nonattainment Area for the Year 2004

Facility Type	Daily VMT (miles)	Daily VHT	Modeled Speed	Speed Used	Silt Loading	Factor (kg/mi)	Total (kg/day)
Interstate	450,868	8,738	51.60	55.00	0.040	0.000370	166.8
Principal Arterials	972,027	25,688	37.84	42.00	0.040	0.001920	1,866.3
Minor Arterials	741,717	22,402	33.11	40.00	0.070	0.001920	1,424.1
Rural Major Collectors	51,790	1,188	43.57	45.00	0.240	0.003490	180.7
Rural Minor Collectors	396,212	9,730	40.72	46.00	0.240	0.003490	1,382.8
Urban Collectors	136,550	5,039	27.10	35.00	0.240	0.001640	223.9
Local Roads	5,043	144	34.97	35.00	0.580	0.003980	20.1
Interstate Ramps	43,629	1,440	30.30	35.00	0.040	0.000370	16.1
Local Paved	1,003,951			20.00	0.580	0.003980	3,995.7
Local Unpaved	72,281			10.00	0.580	0.108570	7,847.5
DAILY TOTAL	3,874,068	74,369					17,124.0

*PM10 Emissions (tons/day) – 18.88

*PM10 Emissions (tons/year) – 6,891.2

SOURCE: Yuma Metropolitan Planning Organization and Lima and Associates, Inc. 2005

Table 4-15. Mobile Sources Emissions Data Used in the Calculation of the Mobile Source Emissions Budgets for the Yuma Nonattainment Area for the Year 2008

Facility	Daily VMT (miles)	Daily VHT	Modeled Speed	Speed Used	Silt Loading	Factor (kg/mi)	Total (kg/day)
Interstate	507,964	9,863	51.50	55.00	0.040	0.000370	187.9
Principal Arterials	1,089,183	28,830	37.78	42.00	0.040	0.001920	2,091.2
Minor Arterials	853,125	25,899	32.94	40.00	0.070	0.001920	1,638.0
Rural Major Collectors	73,965	1,758	42.17	45.00	0.240	0.003490	258.1
Rural Minor Collectors	468,916	11,871	39.50	46.00	0.240	0.003490	1,636.5
Urban Collectors	156,972	5,792	27.10	35.00	0.240	0.001640	257.4
Local Roads	5,176	149	34.71	35.00	0.580	0.003980	20.6
Interstate Ramps	49,491	1,784	27.74	35.00	0.040	0.000370	18.3
Local Paved	1,165,752			20.00	0.580	0.003980	4,640.0
Local Unpaved	76,469			10.00	0.580	0.108570	8,302.2
Daily Totals	4,447,013	85,946					19,050.2

*PM_{10} Emissions (tons/day) – 21.00
*PM_{10} Emissions (tons/year) – 7,664.7

SOURCE: Yuma Metropolitan Planning Organization and Lima and Associates, Inc. 2005

Table 4-16. Mobile Sources Emissions Data Used in the Calculation of the Mobile Source Emissions Budgets for the Yuma Nonattainment Area for the Year 2016

Facility	Daily VMT (miles)	Daily VHT	Modeled Speed	Speed Used	Silt Loading	Factor (kg/mi)	Total (kg/day)
Interstate	662,471	12,659	52.33	55.00	0.040	0.000370	245.1
Principal Arterials	1,466,306	41,539	35.30	42.00	0.300	0.001920	2,815.3
Minor Arterials	1,007,532	32,696	30.82	40.00	0.300	0.001920	1,934.5
Rural Major Collectors	166,904	3,834	43.53	45.00	0.700	0.003490	582.5
Rural Minor Collectors	870,323	23,261	37.42	46.00	0.700	0.003490	3,037.4
Urban Collectors	247,995	8,699	28.51	35.00	0.240	0.001640	406.7
Local Roads	8,133	232	35.06	35.00	0.850	0.003980	32.4
Interstate Ramps	63,083	2,206	28.60	35.00	0.040	0.000370	23.3
Local Paved	1,510,851			20.00	0.850	0.003980	6,013.2
Local Unpaved	100,856.76			10.00	0.850	0.108570	10,950.0
Daily Totals	6,104,454.76	125,126					26,040.4

***PM_{10} Emissions (tons/day) – 28.64**

***PM_{10} Emissions (tons/year) – 10,455.2**

SOURCE: Yuma Metropolitan Planning Organization and Lima and Associates, Inc. 2005

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5.0 MODELING

5.1 Introduction

The Yuma Nonattainment Area's ambient monitoring data have demonstrated attainment since 1991. The area, however, must also demonstrate that the clean air will last ten years into the future, despite the anticipated growth of the Yuma Valley. This demonstration consists of several steps:

- Choose several dates, called design days, from the base year 1999 to study, taking into account a variety of different meteorological conditions and the four seasons of the year (see Yuma Maintenance Plan Technical Support Document (TSD) Section 2.2);

- Build inventories of emissions for the base year 1999 and the future year 2016, and convert these inventories into a numerical format compatible with an air quality model (Yuma Maintenance Plan TSD Section 2.3);

- For each design day, calculate the background PM_{10} concentrations. These are the concentrations that would have occurred had there been no anthropogenic emissions from within the Yuma modeling domain (TSD Section 2.4);

- Simulate the PM_{10} concentrations of the base year with an air quality model. This model provides predicted concentrations based on the emissions and specific meteorological conditions of each design day (TSD Section 2.5); and

- Simulate the PM_{10} concentrations of the future year 2016, with the future year emissions and the base year meteorological conditions (TSD Section 2.6).

A demonstration of attainment is shown for the base and future years when the modeled PM_{10} concentrations for the base-year and the modeled PM_{10} concentrations for 2016 are below the standard (see TSD Section 2.7).

5.2 Modeling Design Days for Base Year

PM_{10} concentrations for the base year 1999 are shown in Table 5-1. Yuma's monitoring in 1999 was done with two collocated samplers. Data from the original sampler were found to be invalid for the second half of the year. The annual average was 37 ug/m^3; the highest 24-hour average was 102 ug/m^3 (standards are 50 ug/m^3 and 150 ug/m^3, respectively). The design days chosen, given in Table 5-2, represent all the seasons and a variety of meteorological conditions.

Table 5-1. Yuma PM_{10} Concentrations for 1999 (24-Hour Averages in ug/m^3)					
Date	**Original**	**Duplicate**	**Date**	**Original**	**Duplicate**
1/6/99	45	45	7/5/99	43	71
1/12/99	55	48	7/11/99	40	44
1/18/99	45	40	7/17/99	19	
1/24/99	35	33	7/23/99		24
1/30/99	35	34	7/29/99		
2/5/99			8/4/99		
2/11/99	19	19	8/10/99		26
2/17/99	61	58	8/16/99		35
2/23/99	28	29	8/22/99		27
3/1/99	64	65	8/28/99		18
3/7/99	28	17	9/3/99		88
3/13/99	38	40	9/9/99		37
3/19/99			9/15/99		38
3/25/99	17	18	9/21/99		34
3/31/99	102	74	9/27/99		28
4/6/99	20	22	10/3/99		31
4/12/99	20	17	10/9/99		67
4/18/99	19	22	10/15/99		47
4/24/99	22	21	10/21/99		43
4/30/99	36	36	10/27/99		37
5/6/99	24	34	11/2/99		65
5/12/99	27	31	11/8/99		32
5/18/99	31	36	11/14/99		46
5/24/99	32	34	11/20/99		50
5/30/99	21	30	11/26/99		54
6/5/99	26	28	12/2/99		15
6/11/99	42	45	12/8/99		46
6/17/99	19	22	12/14/99		35
6/23/99	43	44	12/20/99		19
6/29/99		42	12/26/99		19

SOURCE: Yuma Maintenance Plan TSD, 2006

Table 5-2. PM_{10} Design Days for 1999				
Date	PM_{10} (ug/m^3)		Day of Week	Meteorological Conditions and Emissions
	Original	Duplicate		
1/12/99	55	48	Tuesday	Low Winds, Agricultural Tillage
3/31/99	102	74	Wednesday	High Winds
5/30/99	21	30	Sunday	Low Winds
6/23/99	43	44	Wednesday	Low Winds
7/17/99	19		Saturday	Low Winds
11/8/99		32	Monday	Low Winds
12/8/99		46	Wednesday	Low Winds, Agricultural Tillage

These dates also cover both low and high winds, two of the three highest recorded concentrations, and a wide range of low to moderate concentrations.

5.3 Emissions Inventory

5.3.1 Findings from the Inventory

A complete inventory of PM_{10} emissions for the Yuma area was constructed for the modeling domain shown in Figure 5.1. The PM_{10} emissions inventory for modeling was based on seven different dates in 1999. The emissions domain covers 945 square miles (2,464, km^2), with the City of Yuma located near its center. The emissions domain is a rectangle aligned east and west, with 14 grids in the east-west direction and 11 grids in the north-south direction. Each grid is a square 4 kilometers on a side. This emissions inventory domain is also the modeling domain.

Table 5-3 presents the 1999 and 2016 annual PM_{10} emissions by source category. On low-wind days, the dominant source categories are unpaved roads, road construction, agricultural tilling, and reentrained dust from paved roads. Windblown dust emissions are dominated by fallow agricultural fields, unpaved agricultural roads, and miscellaneous disturbed areas. These figures reflect the modeling area, which is twice the size as the nonattainment area.

Table 5-3. Yuma PM_{10} Emissions for 1999 and 2016			
Source Category	**Annual Tons of PM_{10}**		
	1999	**2016**	**% Change***
Agricultural and Prescribed Burning	40.7	34.1	16.2
Agricultural Tilling	3,572	3,572	0.0
Agricultural Cultivation and Harvesting	16	16	0.0
Windblown Dust	130,331	127,046	2.5
Unpaved Roads	10,183	5,537	45.6
Paved Roads – Re-entrained Dust	3,419	5,839	-70.8
Road Construction	6,761	10,702	-58.3
General Building Construction	54	88	-63.0
Aircraft	16	16	0.0
Unpaved Airstrips	1	1	0.0
Stationary Sources	77	119	-54.5
Railroad Locomotives	17	15	11.8
Total	**154,487**	**152,985**	**1.0**

% Change: Positive values are decreases in emissions;
Negative values are increases in emissions.

SOURCE: Yuma Maintenance Plan TSD, 2006

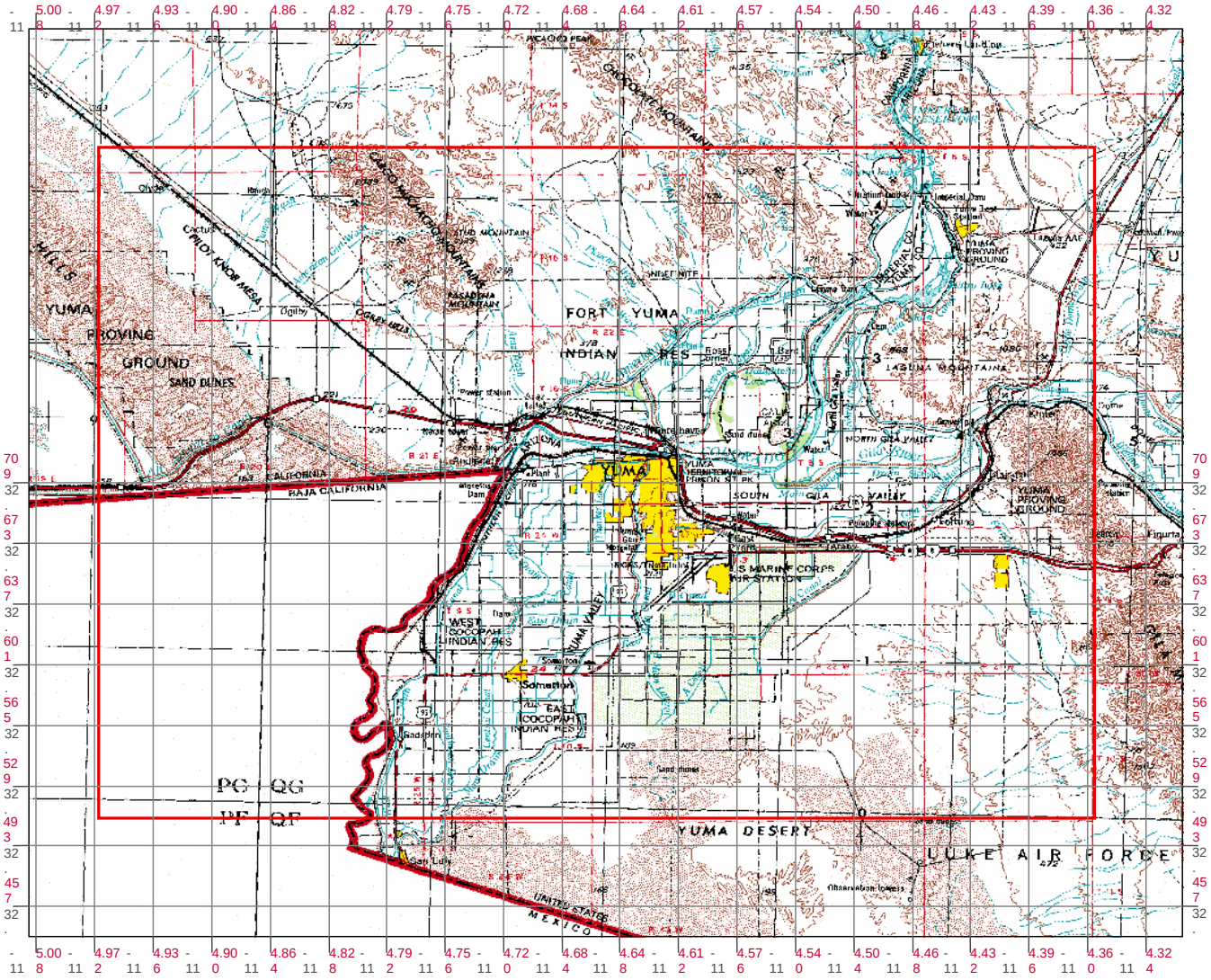

Figure 5-1. Yuma PM_{10} Emissions and Air Quality Modeling Domain (Orange Rectangle)

The windbown dust category was divided into six categories (see Table 5-4), with fallow agricultural fields, miscellaneous disturbed areas, and unpaved agricultural roads accounting for 94% of the windblown PM_{10} emissions. The wide differences between the surface area of each category and the annual emissions reflect the variable potential of the different land surfaces to produce windblown dust emissions. These figures, which come directly from the contractor's inventory (see Appendix A of the TSD), reflect the modeling area, which is twice the size of the nonattainment area.

Table 5-4. Windblown PM_{10} Emissions

Windblown Emissions	Acres	Tons/Yr
Fallow Agricultural Fields	181,000[1]	65,835
Miscellaneous Disturbed Areas	26,000	33,996
Unpaved Agricultural Roads	17,000	22,160
Urban Disturbed Areas	4,100	5,442
Alluvial Plains and Channels	141,000	2,517
Native Desert	74,300	382

SOURCE: Yuma Maintenance Plan TSD, 2006

5.3.2 Additional Aspects of the Emissions Inventory

The PM_{10} emissions inventory for modeling, developed for the Yuma study area, covered eight days each for the years 1999 and 2016 (Table 5-5). The inventory was completed before the air quality design dates were chosen. Therefore, these emission inventory dates do not match the chosen air quality dates exactly. The emission inventory date was matched with the most appropriate air quality date, based on season, day-of-week, and presence or absence of agricultural emissions and windblown emissions.

[1] The corrected number of fallow (vacant) agricultural acres in the Yuma Nonattainment Area is 14,000. The estimate of 181,000 acres for fallow agricultural land comes directly from the contractor's emission inventory report, reprinted in the Technical Support Document as Appendix A. On page 7 of the report, the authors state that because "vacant agricultural land varies by season, the total acreage of agricultural land was multiplied by the following percentages: fall = 35%, winter = 40 %, spring = 10%, and summer = 10%. The windblown emissions from this acreage went into the air quality model.

In later discussions with the Yuma farming community, it became obvious that this estimate was too large. Based on Yuma area farming practices, this estimate was reduced by 90%, which yielded a "vacant (or fallow) field acreage" of 14,000 acres in the nonattainment area on an annual basis. More discussion of this subject can be found in Appendix C in the Technical Support Document.

The over estimation of windblown emissions based on the 181,000 acres contributed to the model's over estimation of measured particulates concentrations on March 31, 1999. But because it was an over estimate, and because compliance with the standards was demonstrated, it is not necessary to redo the air quality modeling.

Table 5-5. Study Dates for the Emissions Inventory	
Julian Day	**Calendar Date**
99015	Friday, January 15, 1999
99017	Sunday, January 17, 1999
99105	Thursday, April 15, 1999
99107	Saturday, April 17, 1999
99196	Thursday, July 15, 1999
99198	Saturday, July 17, 1999
99288	Friday, October 15, 1999
99290	Sunday, October 17, 1999
13015	Tuesday, January 15, 2016
13020	Sunday, January 20, 2016
13105	Monday, April 15, 2016
13110	Saturday, April 20, 2016
13196	Monday, July 15, 2016
13201	Saturday, July 20, 2016
13288	Tuesday, October 15, 2016
13293	Sunday, October 20, 2016

SOURCE: Yuma Maintenance Plan TSD, 2006

5.3.3 Gather Additional Information to Estimate Mexican Emissions

In addition to the modeling completed for this maintenance plan, data pertaining to Mexican emissions are being obtained through the Western Arizona-Sonora Border Air Quality Study (WASBAQS). With funding provided by U.S. EPA Region 9, ADEQ is conducting a Binational Air Quality Study for the Yuma-San Luis Border Region. This study is anticipated to determine the type and sources of harmful compounds in the air, and relate the emissions of these compounds to their concentrations in the air through computer modeling. Subject to the availability of federal funding, data collection for this study will occur over the next two years (2006 - 2007) and includes meteorological measurements and air quality measurements from various locations within the Study area. Once all the data were collected, provided federal funding is available, a complete emissions inventory will be built and meteorological and air quality modeling will be performed during 2007 and 2008 to evaluate the spatial and temporal distribution of the air pollution. Additionally, a health risk assessment during 2008 and 2009 will evaluate population exposure and the potential risk of such exposure, if federal funding continues. Final study results, expected in late 2009, will include an evaluation of the contribution of the various emissions sources and analyze various potential emissions reductions techniques.

5.4 Background Concentrations

5.4.1 Introduction

Background concentrations of an air pollutant are those concentrations that would be measured in the total absence of any anthropogenic emissions in a particular study area. Outside of any study area, both anthropogenic and natural emissions give rise to background concentrations. The Yuma PM_{10} background concentrations arise from both natural and anthropogenic sources in Mexico, California, and other parts of Arizona. These concentrations are transported into Yuma and are considered that part of the total aerosol that is not subject to reduction through local controls.

Concentrations of PM_{10} prevail outside the Yuma modeling domain. They result from both natural and anthropogenic emissions outside the modeling domain, but are transported into it. These "outside" or "background" PM_{10} concentrations contribute to the locally monitored concentrations. They have to be accounted for in assessing the air quality in Yuma.

To quantify the Yuma background concentrations, monitored PM_{10} concentrations from outside the Yuma modeling domain, mixing heights, wind speeds and directions, and the hourly distribution of background PM_{10} concentrations were all analyzed. The calculated background concentrations are added to those predicted by the model, which are based entirely on local Yuma emissions. The sum of concentrations coming from the emissions within the modeling domain plus background PM_{10} concentrations – otherwise known as the "total prediction" ─ can then be compared with the measurements.

5.4.2 Data Sources

Ambient PM_{10} monitoring data for the design days were available in 24-hour averages from several locations, all of which were brought into the background calculations. Hourly PM_{10} concentration profiles were obtained from Green Valley, Arizona and Calexico, California. Wind speed and direction were obtained from several sites in the Yuma vicinity. These locations are contained in Table 5-7. Mixing heights were calculated from the upper air observations in Tucson.

Table 5-6. Measurement Sites in the Background Calculations Particulate Matter (PM)

$PM_{2.5}$ and $PM_{2.5\text{-}10}$ (24-Hour Averages)	**PM_{10} (24-Hour Averages)**	**PM_{10} Hourly**	**Wind Speed And Direction**
Yuma	Yuma		Yuma
		Green Valley	Many Others
Organ Pipe	Organ Pipe	Calexico, CA	
Ajo			
El Centro, CA			
Brawley, CA			

SOURCE: Yuma Maintenance Plan TSD, 2006

5.4.3 Overview of PM_{10} Background Calculations

The calculation of background concentrations for Yuma is a multi-step process that accounts for wind direction, wind speed, mixing heights, and gravitational settling of fine and coarse PM.

The contribution to background PM_{10} in Yuma uses wind direction, wind speed, and mixing heights in the composite estimation process. The wind direction is used to identify which source sector contributes for that hour. For example, if the wind direction is out of the south to the west, then the hourly pattern was based on the PM measurements from Calexico. All other sectors were based on Green Valley. Thus, the regional composite PM background concentration – on an hourly basis -- is the 24-hour concentration recorded at a background site multiplied by the hourly percent value from either the Calexico or Green Valley sectors. These hourly concentrations, as explained below, were treated further to account for particle settling. Table 5-8 gives both the outlying PM_{10} concentrations and the Yuma background concentrations derived from them.

Table 5-7. Calculated Background PM_{10} Concentrations

Date	Upwind PM_{10}	Winds		Calculated Background PM (ug/m^3)			Yuma PM_{10}	Back-ground %*
		Speed	Dir.	$PM_{2.5}$	$PM_{2.5-10}$	PM_{10}		
12 Jan	40-60	Low	SSE-WSW	7.1	8.2	15.3	52	30
31 Mar	40-60	High	WNW	10.1	14.4	24.5	88	28
30 May	20-120	Low	SW,NW	10.5	20.7	31.3	26	123
23 Jun	30-50	High	SSW-SSE	10.2	21.4	31.6	44	73
17Jul	25-40	Low	WNW-NNW	10.5	17.9	28.4	19	150
8 Nov	25	Low	WNW	5.9	7.6	13.6	32	43
8 Dec	30-40	Low	NNW	6.8	7.2	14.0	46	30

*%: the background concentration as a percentage of Yuma PM_{10}. The average of the two concentrations was used where available.

SOURCE: Yuma Maintenance Plan TSD, 2006

5.4.4 Results of Background Calculations

These calculations yielded reasonable background values for five of the seven design days (Table 5-9). For May 30 and July 17, however, the calculated background concentrations exceeded the Yuma measurements. While this is not impossible, it does defy the logic of the entire background exercise. The Yuma concentrations on these two days were extremely low: 21 and 30 ug/m^3 on May 30 and 19 ug/m^3 on July 17.

Concentrations in the surrounding areas were apparently higher than in Yuma, as calculated by this method. In place of these calculated values, the 24-hour average PM_{10} concentrations from Organ Pipe National Monument for these two dates have been substituted.

Part of the anomalously high background concentrations on the two dates could be that the same sources are contributing to both "background" concentrations and concentrations in Yuma. The distances involved argue against large contributions to Yuma PM_{10} from these outlying sources. The background sites of Palo Verde (107 miles), Ajo (102 miles), and El Centro (65 miles) are too distant from Yuma to make major contributions to its PM_{10} loading. In addition, the Ajo and Palo Verde sites lie east of Yuma, which puts them predominantly downwind due to prevailing daytime westerly and southwesterly winds. As Tables 5-8 and 5-9 show, however, the contributions are on the order of 30% with, on occasion, even higher contributions possible. Sources in the immediate vicinity of these background monitors, as well as sources between them and Yuma, do contribute to both concentrations.

In place of these calculated values, the 24-hour average PM_{10} concentrations from Organ Pipe National Monument for these two dates have been substituted. These final background values and the percentage they comprise of the Yuma concentrations are shown in Table 5-10.

Table 5-8. Calculated Background PM_{10} Concentrations

Date	Winds	Measured Yuma PM_{10} (ug/m^3)		Calculated Background PM_{10} (ug/m^3)			
		Original	Duplicate	$PM_{2.5}$	$PM_{2.5-10}$	PM_{10}	%*
1/12/99	Low	55	48	7.1	8.2	15.3	29.7
3/31/99	High	102	74	10.1	14.4	24.5	27.8
5/30/99	Low	21	30	10.5	20.7	31.3	122.7
6/23/99	High	43	44	10.2	21.4	31.6	72.6
7/17/99	Low	19		10.5	17.9	28.4	149.5
11/8/99	Low		32	5.9	7.6	13.6	42.5
12/8/99	Low		46	6.8	7.2	14.0	30.4

(May 30 and July 17 are shown with their calculated values, which exceed Yuma's monitored concentrations.)

*%: Background concentration as a percentage of Yuma PM_{10}. The average of the two concentrations was used where available.

SOURCE: Yuma Maintenance Plan TSD, 2006

Table 5-9. Final Adjusted Background PM_{10} Concentrations							
Date	**Winds**	**Yuma PM_{10} (ug/m^3)**		**Background PM_{10} (ug/m^3)**			
		Original	**Duplicate**	**$PM_{2.5}$**	**$PM_{2.5-10}$**	**PM_{10}**	**%***
1/12/99	Low	55	48	7.1	8.2	15.3	29.7
3/31/99	High	102	74	10.1	14.4	24.5	27.8
5/30/99	Low	21	30	**5.9**	**8.1**	**14.0**	53.8
6/23/99	High	43	44	10.2	21.4	31.6	72.6
7/17/99	Low	19		**5.7**	**8.5**	**14.2**	73.7
11/8/99	Low		32	5.9	7.6	13.6	42.5
12/8/99	Low		46	6.8	7.2	14.0	30.4

(Background values for May 30 and July 17 have been set equal to the concentrations measured at Organ Pipe National Monument on these dates.)

*%: Background concentration as a percentage of Yuma PM_{10}. The average of the two concentrations was used where available.

** 24-Hour average Organ Pipe National Monument $PM_{2.5}$, $PM_{2.5-10}$, and PM_{10} concentrations substituted for calculated values, which exceeded the measured PM_{10} concentrations in Yuma

SOURCE: Yuma Maintenance Plan TSD, 2006

5.5 Model Simulations for the Base Year

PM_{10} concentrations in Yuma, Arizona were simulated using the Industrial Source Complex Short Term (Version-3) – ISCST-3. This numerical model is a steady-state Gaussian dispersion model that has been approved by the U.S. Environmental Protection Agency and has a long history of applicants in both the industrial and urban settings. The modeling domain consisted of an array of 4000 x 4000 meter grids, with a total of 154 grids covering the City of Yuma and the vicinity. Table 5-11 illustrates the results of modeling the hourly emissions files with the day-specific meteorological files to generate day specific 24-hour average predictions for PM_{10}.

Table 5-10. Illustrates the 1999 PM_{10} Results at the Yuma Juvenile Center							
Actual 1999 Met & Air Quality Day	1/12/99	3/31/99	5/30/99	6/23/99	7/17/99	11/8/99	12/8/99
Pechan Inventory Day	1/15/99	4/15/99	4/17/99	7/15/99	7/17/99	10/15/99	1/15/99
PM_{10} (ug/m^3)	**148**	**138**	**48**	**67**	**46**	**60**	**85**

Figure 5.2 illustrates that on the low-wind day, the predicted concentrations in the 25 to 50 ug/m^3 range in cell 9F can be attributed to construction emissions: road and general building construction in Somerton. These emissions are evidently high enough to produce these localized concentrations above the 0 to 25 ug/m^3 range.

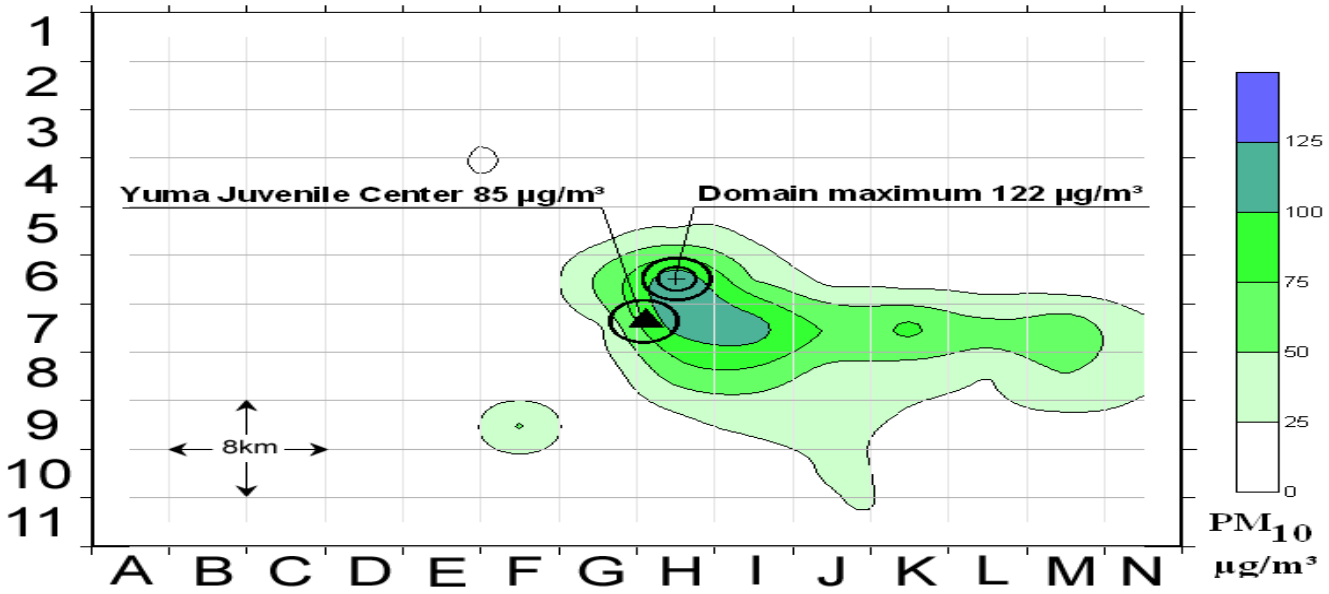

Figure 5-2. December 8, 1999, PM_{10} Results for the Yuma Domain (Low Wind)

The output files generated were also used to create day-specific PM_{10} concentration maps for the Yuma domain. Such concentration maps are Figure 5.2 above (a low wind concentration field), and Figure 5-3 below (a high wind PM_{10} concentration field.

5.5.1 Modified Rollback for the High-Wind Day

Numerous sensitivity tests and discussions with EPA Region 9 staff were conducted in the wake of the high-wind day modeling of March 31, 1999, for which the model produced extreme over-predictions. These over-predictions at the monitoring site were tolerable (138 ug/m^3 for the model, 25 ug/m^3 for background, versus a pair of observations of 74 and 102 ug/m^3). Maximum predicted concentrations anywhere in the domain ranged from 300 to nearly 800 ug/m^3. Sensitivity tests are described in Appendix B of the Yuma Maintenance Plan TSD.

Permission was obtained from EPA to employ a modified rollback approach. This means that the windblown emissions are rolled back until the model predicts in the range of the measured values. Rollback was employed only for those hours with windblown dust in the model. These hours are for average hourly wind speeds of 15 miles per hour or greater. On March 31, 1999, a trough and frontal passage brought strong, gusty winds from the west and northwest from 1:00 p.m. through midnight, with visibility reduced to four miles caused by blowing dust from 1:00 p.m. through 4:00 p.m. Table 5-12 shows that seven hours on this date had average hourly wind speeds exceeding the windblown dust resuspension threshold. In the air quality modeling, each of these high-wind hours was simulated with windblown dust emissions. Figure 5-4 shows the simulated hourly PM_{10} concentrations for this date.

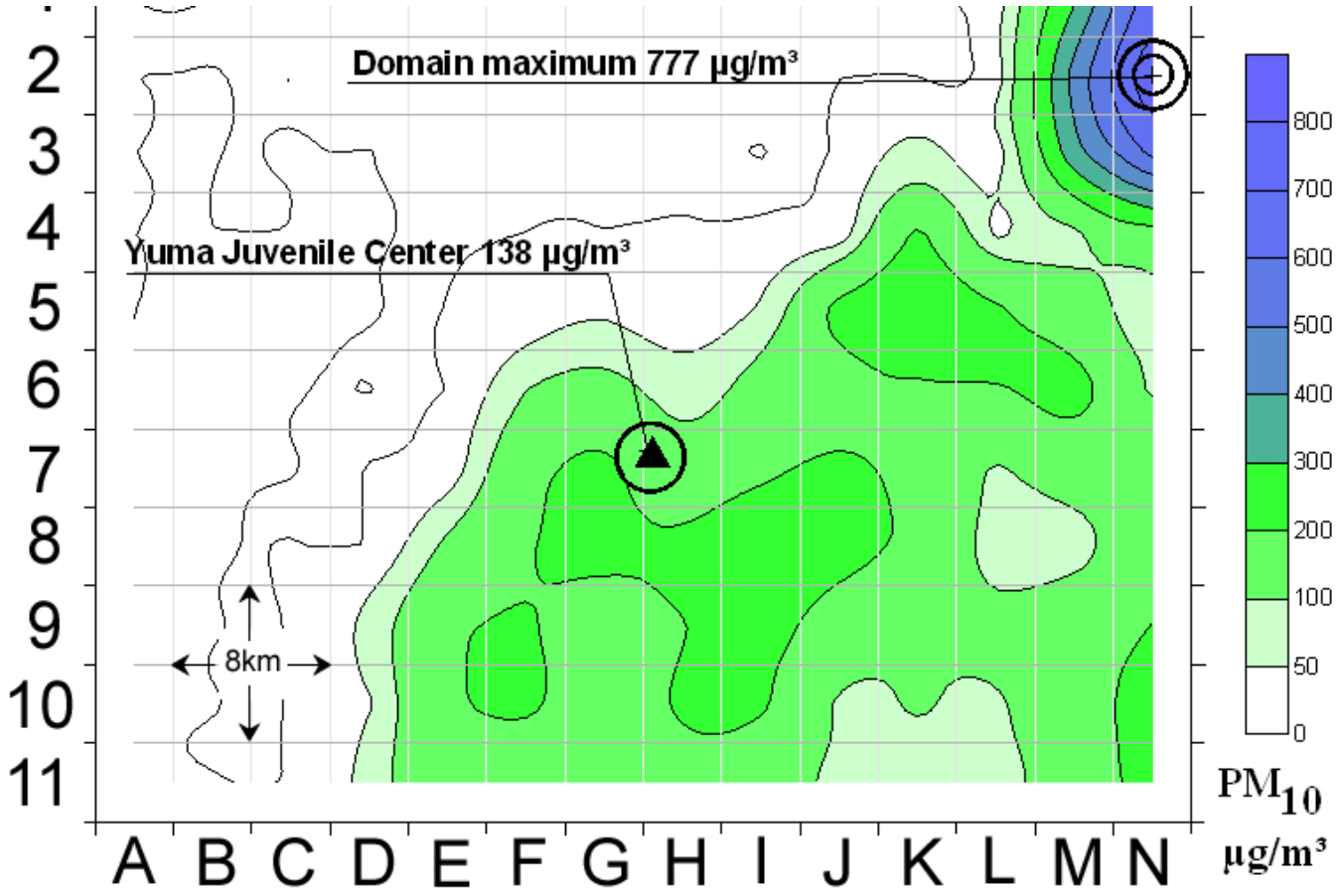

Figure 5.3 March 31, 1999, PM_{10} Results for the Yuma Domain (High Wind)

Table 5-11. Hourly Average Wind Speeds for March 31, 1999			
Hour	**Wind Speed (mph)**	**Wind Direction (Degrees)**	**Remarks**
10	13.6	286	
11	13.2	298	
12	13.4	299	
13	13.9	297	
14	14.8	285	
15	**15.0**	283	Windblown Dust
16	**17.9**	283	Windblown Dust
17	**18.3**	288	Windblown Dust
18	14.5	285	
19	**15.2**	283	Windblown Dust
20	**15.7**	297	Windblown Dust
21	**15.9**	299	Windblown Dust
22	14.8	293	
23	**17.7**	299	Windblown Dust
24	13.9	313	

Note: 270 degrees is winds out of the west; 315 degrees is out of the northwest. The prevailing wind direction of this storm was out of the west-northwest.

SOURCE: Yuma Maintenance Plan TSD, 2006

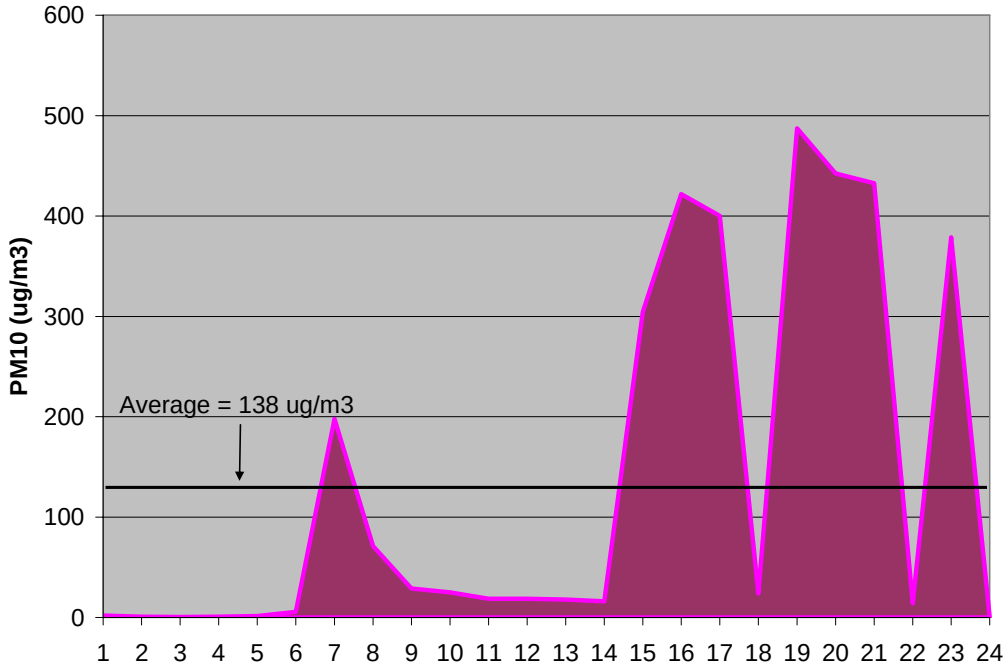

Figure 5-4. Model-simulated PM_{10} Concentrations at the Yuma Juvenile Center for March 31, 1999: Windblown Emissions from the Inventory

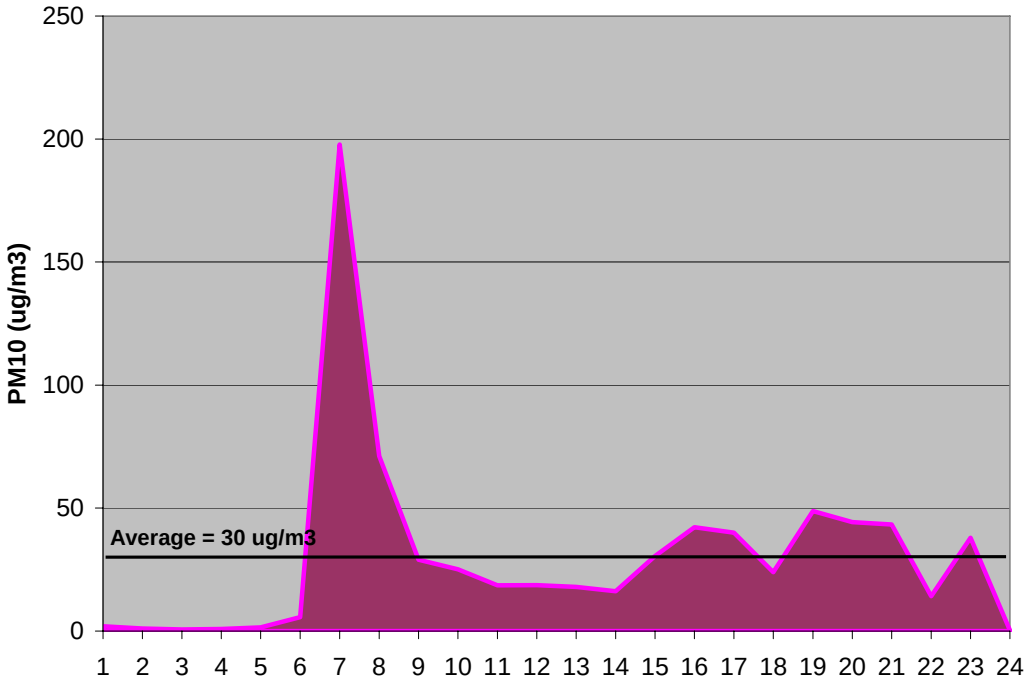

Figure 5-5. Model-simulated PM_{10} Concentrations at the Yuma Juvenile Center for March 31, 1999: Windblown Emissions Divided by Seven

As the hourly PM_{10} concentrations are lowered by this rollback approach, so are the 24-hour averages. The concentrations based on the scaled emissions are all well within the standard of 150 ug/m^3 (Figure 5-6). The spatial distribution of the PM_{10} concentrations between the two simulations is similar, but the magnitude of the rollback simulation is much lower.

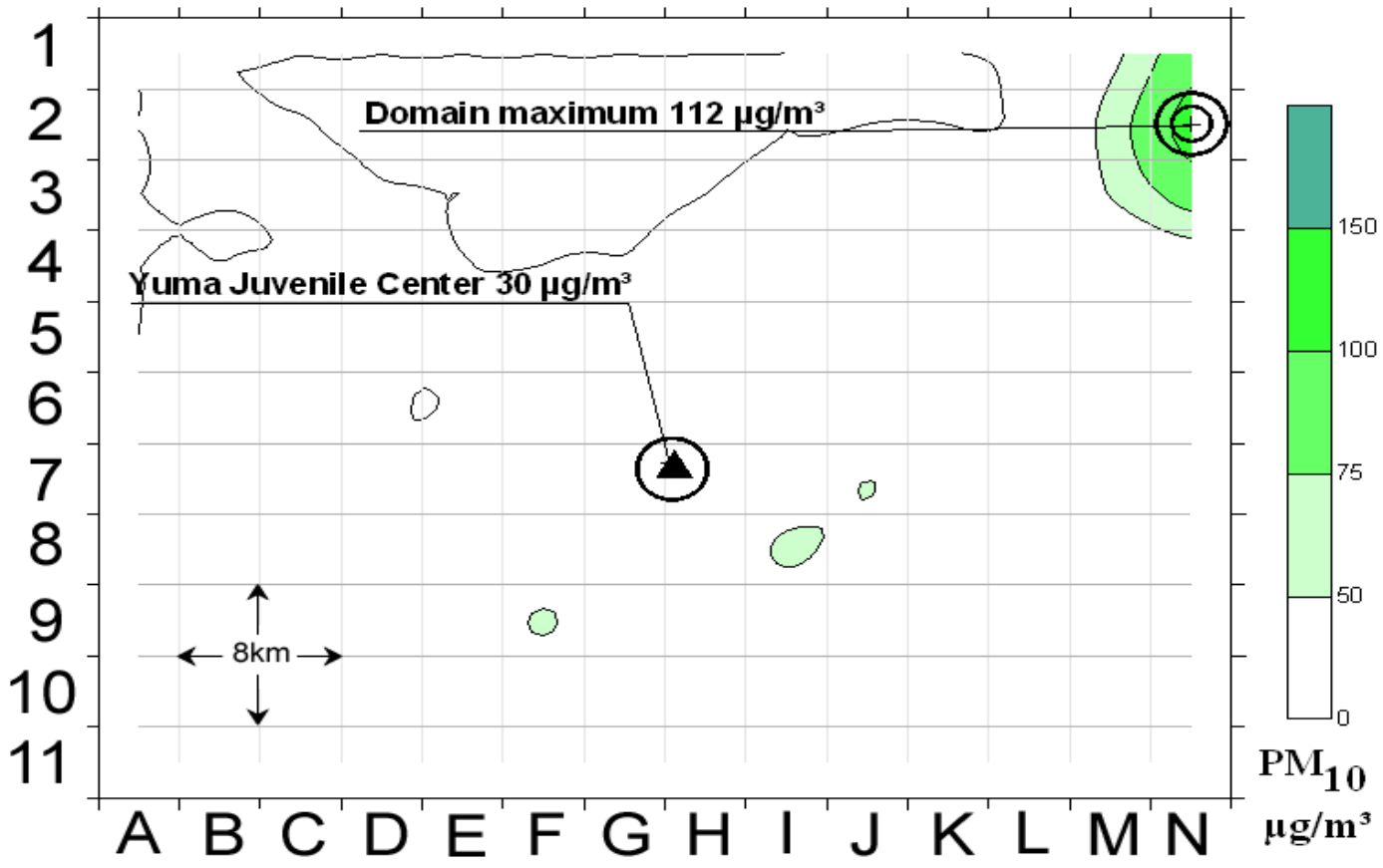

Figure 5-6. PM_{10} Concentrations in Yuma on March 31, 1999, with Emissions Scaled by a Factor of Seven

The need for this rollback approach points to some inadequacies of the modeling system's ability to simulate windblown dust. Ideally, the windblown emissions of the inventory, coupled with the dispersion of the air quality model, would yield simulated concentrations closer to those that were measured. This correspondence between predicted and observed PM_{10} concentrations, especially the windblown dust day of March 31, did not materialize in the modeling. Nevertheless, a demonstration of attainment can go forward, with windblown dust emissions will be rolled back by a factor of seven.

Table 5-12. 1999 PM_{10} Model Results at the Yuma Juvenile Center, with ModifiedEmissions for the High-Wind Day of March 31

Actual 19 Met & Air Quality Day	1/12/99	3/31/99	5/30/99	6/23/99	7/17/99	11/8/99	12/8/99
Pechan Inventory Day	1/15/99	4/15/99	4/17/99	7/15/99	7/17/99	10/15/99	1/15/99
PM_{10} (ug/m^3)	**148**	**30**	**48**	**67**	**46**	**60**	**85**

The model performance is also improved, with the March 31 prediction being 30 ug/m^3 from the ISC model and 25 ug/m^3 from the background, yielding a total prediction of 55 ug/m^3. Figure 5-7 has the original estimate and the scaled concentration for March 31.

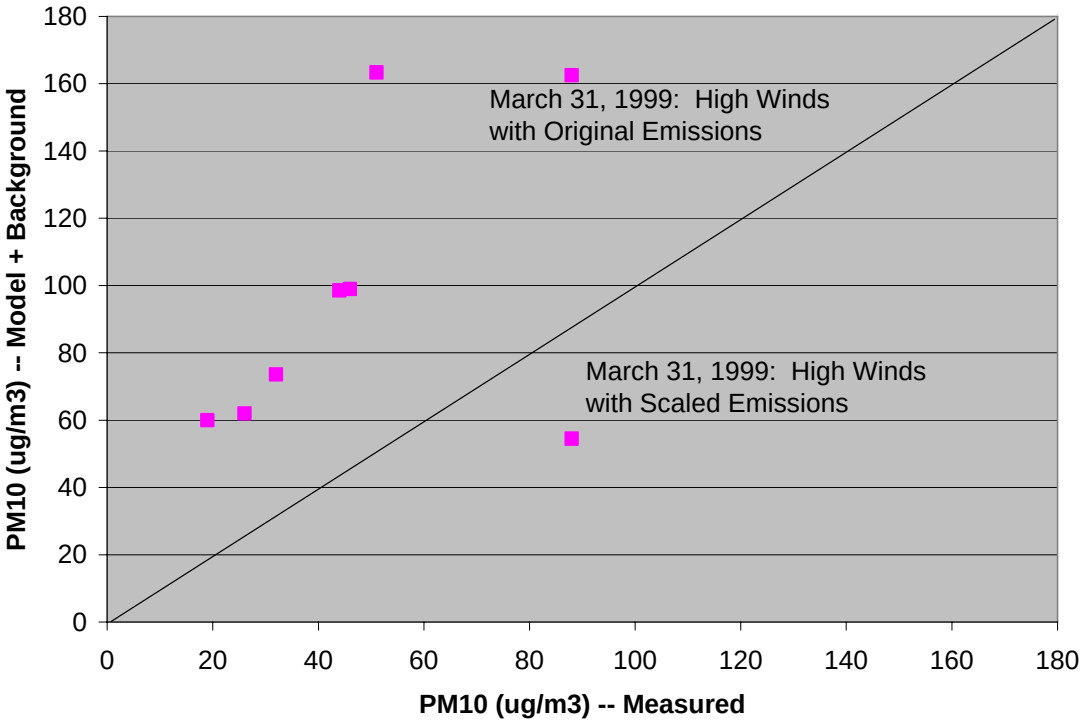

Figure 5-7. Total Prediction (Model + Background) versus Observations of PM_{10} in 1999 – in an X-Y Scatter Plot, with March 31 Shown with the Original and Scaled Emissions

This rollback approach has been carried forward to the 2016 simulations for the high wind day. Before this discussion, it is necessary to look at the predicted PM_{10} concentrations throughout the Yuma area.

5.5.2 Model Predictions Throughout the Domain

The discussions of the last two subsections concern the model-simulated PM_{10} concentrations at a particular point in Yuma: i.e. at the monitoring site located at the Yuma Juvenile Center. While model performance is necessarily limited to the location of the monitoring site, the larger picture of how PM_{10} concentrations are distributed across the modeling domain of Yuma is also important. The Clean Air Act requires that all points within an airshed meet the air quality standards. This section demonstrates that the PM_{10} standards are met throughout the Yuma area.

The simulated concentrations throughout the modeling domain shed some light on how elevated PM_{10} concentrations are distributed throughout the Yuma area on a high-wind

and low-wind day (Figures 5-2 and 5-3). For the low-wind day of December 8, 1999, the measured concentration was 46 ug/m^3; the model-predicted concentration at the monitor was 85 ug/m^3; and the maximum prediction anywhere in the domain was 122 ug/m^3. On that day the highest predicted concentrations and the domain maximum were concentrated in three grid cells (total area of 48 square kilometers) immediately to the northeast and east of the monitor. This close proximity of the monitor with the predicted maximum suggests that under low-wind conditions the model adequately places the highest concentrations in the region near the monitor.

For the high wind day of March 31, 1999, the measured concentrations from the two collocated monitors were 102 and 74 ug/m^3; the predicted concentration at the monitor was 138 ug/m^3; and the maximum prediction anywhere in the domain was 137 ug/m^3. The highest predicted concentrations were concentrated in the far northeast corner of the study area, northeast of the Juvenile Center monitoring site by 26 kilometers. This will be discussed further below. Of greater interest, perhaps, is the closeness of the monitor with the central one of the three elevated zones with concentrations in the 200 to 300 ug/m^3 range. This proximity of the monitoring site to the moderately elevated PM_{10} concentration zone indicates that it does a reasonably good job of capturing high concentrations anywhere in the domain.

With appropriate emissions rollback for the high-wind hours, the model predicts PM_{10} concentrations somewhat below the measurements and within the 24-hour standard throughout the domain (see Figure 5-6).

Both windblown emissions and windblown concentrations (Figures 5-3 and Figure 5-6) are at their highest in four grids in the upper right hand corner of the domain. These emissions come from only one kind of source – miscellaneous disturbed areas. There are no agriculture or alluvial channel emissions in these grids. Satellite images reveal that the land surface in this area is a brown to beige color, in contrast with nearby black mountainous areas. Some of these four grids is occupied by the Yuma Army Proving Grounds. The concentration maps for the low-wind day of December 8, 1999, and for March 31, 1999, the high wind day with emissions rollback, give a clear indication of where the PM_{10} concentrations are high and low. These maps are Figures 5-2 and 5-6. The ISC model was set up to give predicted concentrations at the center point of each of the 154 grids, as well as at the single monitoring site. It is this set of PM_{10} concentrations for all grids that is plotted in these figures.

The maximum predicted PM_{10} concentrations anywhere in the domain are now examined in light of the over-predictions at the monitoring site. Table 5-14 begins with the observation ("Obs") of the 24-hour average PM_{10} concentration at the Juvenile Center. On its right is the calculated background value ("Back"). Because background PM_{10} comes from outside of the Yuma area, it is subtracted from the observation ("Obs – Back"). This difference – the observation with the background subtracted – can then be compared with the ISC model prediction. Dividing this difference by the prediction gives the decimal fractions in the "Ratio" column. For those total predicted concentrations (model plus background) within the standard of 150 ug/m^3, these fractions are not used.

Instead, the model prediction plus the background goes into the far right column called "normalized maximum."

For those predictions that would be above the standard, the fractions are multiplied by the value of the predicted maximum anywhere in the domain (next to last column), with the background added back in to give the "Normalized Maximum". These concentrations are the highest anywhere in the modeling domain. They account for both the background concentration and for the degree of over-prediction by the modeling system. More importantly, these normalized maximum, domain-wide PM_{10} concentrations, reflect the distribution and magnitude of PM_{10} emissions throughout the Yuma area. This set of predicted concentrations demonstrates that all of the Yuma airshed complies with the 24-hour PM_{10} standard, not just the Juvenile Center.

Table 5-13. Domain-Wide PM_{10} Concentrations in Yuma, Based on ISC Model Predictions at the Juvenile Center and Throughout the Domain

Date	Yuma Juvenile Center					Anywhere in the Modeling Domain	
	Obs	Back	Obs - Back	ISC Model Prediction	Ratio (Obs –Back) to Prediction	ISC Predicted Maximum	Normalized Maximum (with Back-Ground)
1/12	51	15	36	148	0.24	195	62
3/31	88	25	63	138	0.46	777*	380*
3/31	88	25	63	30	2.10	112**	137**
5/30	26	14	12	48	0.25	78	92
6/23	44	32	12	67	0.18	97	129
7/17	19	14	5	46	0.11	69	83
11/8	32	14	18	60	0.30	100	114
12/8	46	14	32	85	0.38	122	136

Notes:

Obs	Observation or measurement of PM_{10}
Back	Background PM_{10} concentration (calculated)
Obs – Back	Difference of the two
Ratio	(Observation minus Background) divided by the model prediction
Normalized Maximum	Highest predicted PM_{10} in the domain, normalized for the model over-prediction, and with background added in.
	(All values are calculated or measured PM_{10} concentrations in µg/m3 averaged for 24 hours.)
*	March 31, 1999, high-wind emissions, no emission rollback
**	March 31, 1999, high-wind emissions, with emissions rollback

SOURCE: Yuma Maintenance Plan TSD, 2006

Compliance is shown for both low-wind and high-wind days. For the six low-wind days the normalized domain maxima vary from 62 to 136 ug/m^3, within the 150 ug/m^3 standard. On the high-wind day of March 31, 1999, the table presents both the original model predictions and those predictions that resulted from the emissions rollback. The domain maximum on this high-wind day, with the original inventory, is an unrealistically high 777 ug/m^3. With factor of seven emissions rollback for those hours with windblown dust, this maximum is lowered to 112 ug/m^3. Adding the background of 25 ug/m^3 gives a total model prediction of 137 ug/m^3. This concentration is not only within the standard, it is also much more consistent with the long-term monitoring record in Yuma.

This record is shown in Figure 5-8. The annual high and second-high 24-hour average PM_{10} concentrations from 1985 through 2003 are shown in descending order.

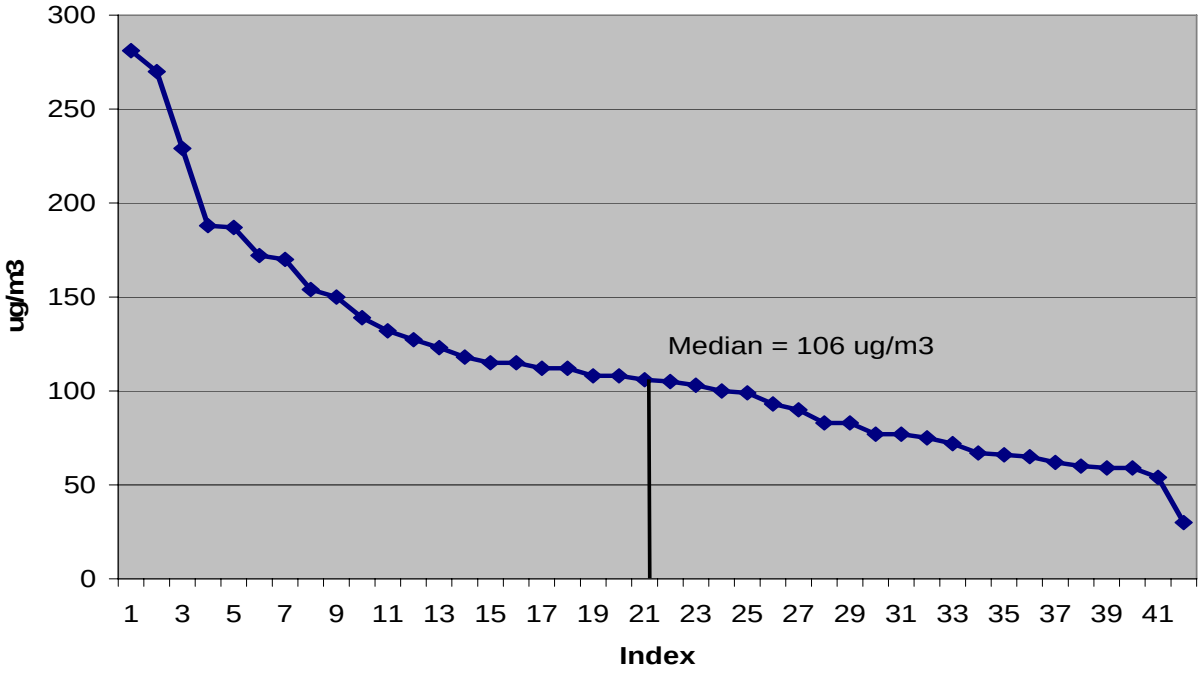

Figure 5-8. Yuma PM_{10} Concentrations: Annual Highs and Second-Highs from 1985 through 2003, Arranged in Descending Order

The top ten values from this figure are shown in Table 5-15 and reveal the following two features of these extreme PM_{10} concentrations:

1. The highest concentrations have remained below 300 ug/m^3, and have not approached the unscaled predicted maximum of 777 ug/m^3 from the modeling.

2. With one exception – 2001 -- these highest concentrations all occurred 15 to 20 years ago.

Table 5-14. Yuma 24-Hour Average PM_{10} Concentrations: 1985 -2003: the Ten Highest Annual Maximum or Second-Highest Concentrations	
Year	**PM_{10}**
1985	281
1990	270
1991	229
1991	188
1987	187
1985	172
1987	170
2001	154
1989	150
1989	139

SOURCE: Yuma Maintenance Plan TSD, 2006

These data support the scaled predicted domain maximum of 112 ug/m^3 (137 ug/m^3 with the background included) for March 31, 1999, given in Table 5-14. Given the capricious pathways of turbulent storms, and given the 20-year length of the monitoring record, if PM_{10} concentrations in the range of 800 ug/m^3 occurred in Yuma, they would have been recorded at the monitoring site. It's interesting to note that this scaled predicted value is close to the median of the extreme values, 106 ug/m^3, lending further support to the reasonableness of this modified elevated PM_{10} concentration.

5.6 Model Simulations for the Projected Year 2016

For the 2016 air quality predictions, Pechan built a set of 2016 emissions files. These files were adjusted and modeled in the same fashion as the 1999 files and generated the PM_{10} predictions of Table 5-16. Figure 5-9 illustrates the low-high wind simulation of December 8, 2016, while Figure 5-10 illustrates high-wind simulation for March 31, 2016.

Table 5-15. Illustrates the 2016 PM_{10} Results at the Yuma Juvenile Center							
Actual Met & Air Quality Day	1/12/99	3/31/99	5/30/99	6/23/99	7/17/99	11/8/99	12/8/99
Pechan Inventory Day	1/15/99	4/15/99	4/17/99	7/15/99	7/17/99	10/15/99	1/15/99
PM_{10} (ug/m^3)	**107**	**28**	**48**	**49**	**28**	**37**	**61**

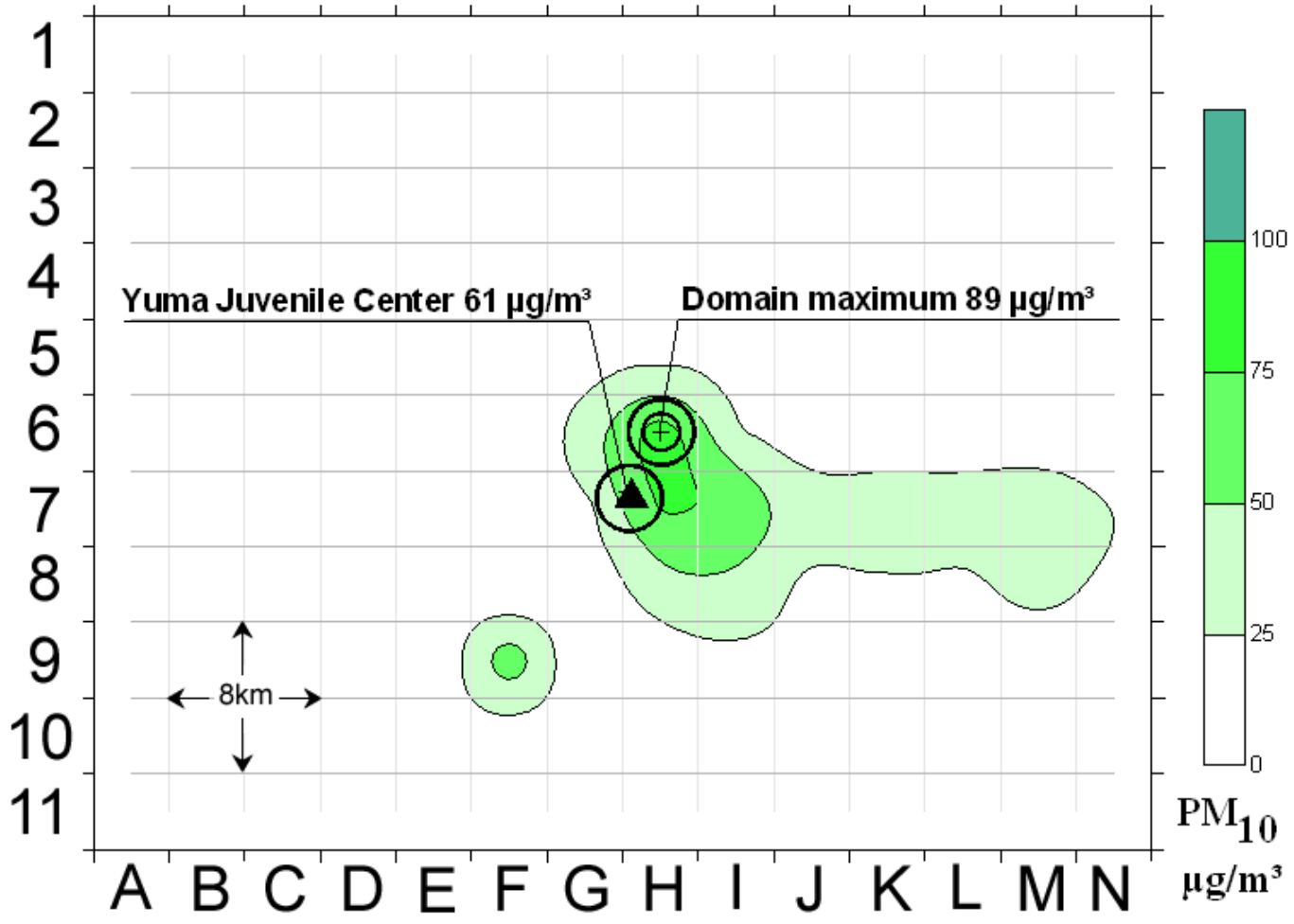

Figure 5-9. December 8, 2016, PM_{10} Predictions for the Yuma Domain

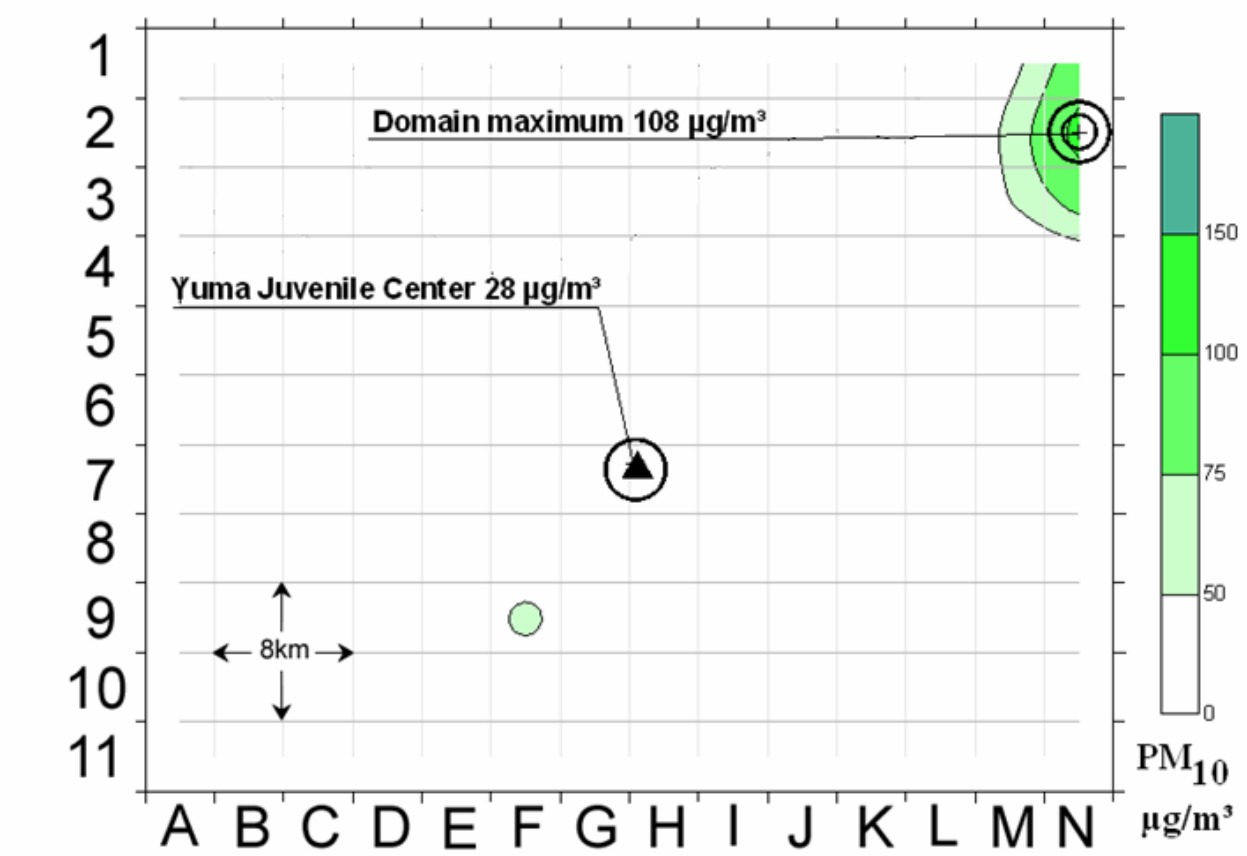

Figure 5-10. March 31, 2016, PM_{10} Prediction for the Yuma Domain, with Emissions Rollback

5.7 Demonstration of Attainment

5.7.1 24-Hour PM_{10} NAAQS

Attainment in 2016 is shown by examining the 1999 observations, calculating the ratio of the 2016 to 1999 total predictions, and applying these ratios to the base year observations. All of these figures, except the ratios, have been assembled in Table 5-17.

Table 5-16. PM_{10} 24-Hour Concentrations in 1999 and 2016 in Yuma: Observations and Model Results						
Date	1999: Observations & Model Results				2016: Model Results	
	Average Observation	Model Prediction	Background	Total Prediction	Model Prediction	Total Prediction
1/12/99	51	148	15	163	107	122
3/31/99*	88	30	25	55	28	53
5/30/99	26	48	14	62	48	62
6/23/99	44	67	32	101	49	81
7/17/99	19	46	14	60	28	42
11/8/99	32	60	14	74	37	51
12/8/99	46	85	14	99	61	75

* With emissions of high-wind hours rolled back

SOURCE: Yuma Maintenance Plan TSD, 2006

In Table 5-18, the 2016 predicted concentrations are shown in the far right column. The concentrations in Table 5-18 demonstrate that Yuma air quality over a ten-year horizon will remain well in compliance with the 24-hour PM_{10} standards.

Table 5-17. Yuma PM_{10} 24-Hour Concentrations for 2016							
	1999			Model Predictions		Ratio (2016/1999) Model Predictions	2016 Calculated PM_{10}
Date	Obs	Back	Obs –Back	2016	1999		
1/12/99	51	15	36	107	148	0.72	41
3/31/99	88	25	63	28	30	0.93	84
5/30/99	26	14	12	48	48	1.00	26
6/23/99	44	32	12	49	67	0.73	41
7/17/99	19	14	5	28	46	0.61	17
11/8/99	32	14	18	37	60	0.62	25
12/8/99	46	14	32	61	85	0.72	37
Avg	43.7	18.3				0.76	

Notes: (Units are $\mu g/m^3$)
Obs is the observation: 24-hour average PM_{10} at the Yuma Juvenile Center
Back is the background concentration
Obs – Back is the background subtracted from the observation

SOURCE: Yuma Maintenance Plan TSD, 2006

5.7.2 Annual PM_{10} NAAQS

Similar results were found for the annual standard. The base-year annual PM_{10} average was 37.0 ug/m^3. This average is based on 56 sampling days, 29 of which had both the original and duplicate samples taken. Based on the background and model predictions for the seven design dates of 1999, this annual average is expected to decrease slightly by 2016 – to 32 ug/m^3. The necessary calculations for this exercise are illustrated in Table 5-19.

Table 5-18. Demonstration of Attainment for the Annual PM_{10} Standard in 2016 in Yuma

Line #	Description	Concentration
1	Average PM_{10} : 7 Design Days 1999 (µg/m^3)	43.7
2	Average PM_{10} : 7 Background Concentrations (µg/m^3)	18.3
3	Average: 7 Background as a Fraction of Observations	0.4
4	Average: 7 2016/1999 Model Prediction Ratio	0.8
5	1999 Annual Average PM_{10} (Juvenile Center) (µg/m^3)	37.0
6	1999 Average Background Value (µg/m^3) [line 3 x line 5]	15.5
7	1999: Annual Average – Average Background (µg/m^3) [line 5-6]	21.5
8	2016 local PM_{10} (µg/m^3) [line 7 x line 4]	16.5
9	2016 Annual Average (µg/m^3) [line 8 + line 6]	31.9

SOURCE: Yuma Maintenance Plan TSD, 2006

An examination of annual PM_{10} averages before and after 1999 reveals that this method would predict attainment in 2016 for the range of concentrations in the most recent ten years. The base year of the study – 1999 – is in no way unique or unusual (Table 5-20 and Figure 5-11).

Table 5-19. Yuma PM_{10} Annual Averages: 1985 – 2004	
Year	**Annual Average**
1985	**63**
1986	**56**
1987	50
1988	41
1988	38
1989	**52**
1989	37
1990	**57**
1991	41
1992	29
1993	31
1994	32
1995	35
1996	36
1997	36
1998	47
1999	35
2000	42
2001	41
2002	48
2003	38
2004	40

SOURCE: Yuma Maintenance Plan TSD, 2006

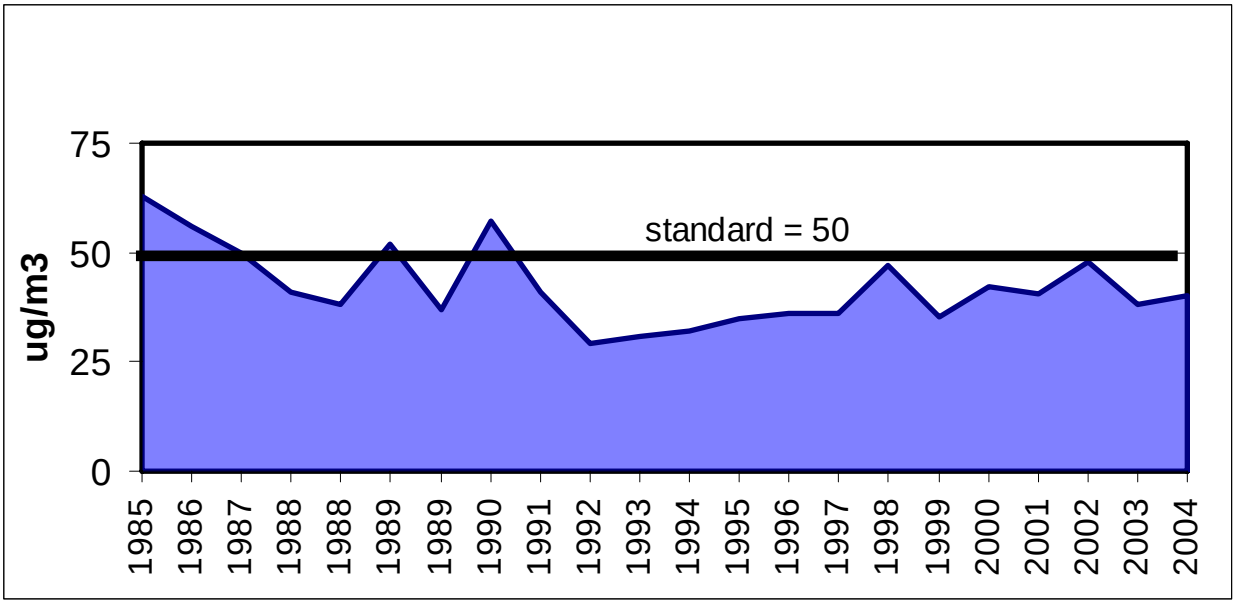

Figure 5-11. Annual PM_{10} Averages for Yuma: 1985 – 2004

In conclusion, attainment is modeled for both the 24-hour PM_{10} NAAQS and the annual PM_{10} NAAQS through 2016 for the Yuma air quality planning area. This maintenance predicts attainment for the next 10 years. If an exceptional event causes the Yuma area to exceed the 24-hr average NAAQS, ADEQ will flag the event as a natural event. If the violation occurred outside of the Yuma Nonattainment Area, it would not be flagged.

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6.0 CONTROL MEASURES

6.1 Maintenance Demonstration Control Measures

The Yuma area stakeholders have implemented specific control measures to reduce PM_{10} emissions in Yuma after the base year of 1999 and commit to continued implementation through 2016. The controls are of two types: area source controls and the use of Agricultural Best Management Practices (AgBMPs) by Yuma farmers. Control measures of the first type include paving unpaved roads; watering unpaved roads; chemically stabilizing unpaved roads by applying magnesium chloride; installing curbs and sidewalks; paving alleys; street sweeping; reducing unauthorized traffic on canal roads by barricades, signs, and patrolling; reducing authorized traffic on canal roads by stocking fish; and controlling dust on open areas resulting from vehicular traffic.

A detailed list of the area source reasonable available control measures (RACMs) implemented in the Yuma area and the PM_{10} emission reductions attributed to each RACM for 2000 through 2004 is provided in Table 6-1. It is important to note that paving emission reductions are not carried over from year to year. For example, an unpaved road being paved in one year gets emission reduction credit for that year only, not the years after completion of the project. Some of the larger reductions in 2000 and 2001 resulted from watering of unpaved roads and unpaved road shoulders by Somerton (1,532 and 2,188 tons, respectively). A total reduction of 1,324 tons was achieved in the City of Yuma by paving unpaved roads in 2000; a total reduction of 687 tons was achieved in the City of Yuma in 2001.

The second type of controls is AgBMPs. The AgBMPs have been designated contingency measures and, consequently, will be discussed in Chapter 7 of this maintenance plan. Yuma area farmers will carry out one AgBMP in each of three categories: tillage, unpaved roads, and wind erosion. The practices available with respect to tillage include combing tractor operations, limiting activity in high winds, and the use of multi-year crops. AgBMPs for unpaved roads include restricting access to roads, reducing speed, and reducing wind erosion from roads. With respect to wind erosion, the use of multi-year crops, residue management, timing of tillage, and planting crops based on soil moisture are the AgBMPs typically applied.

Table 6-1. Yuma Area Control Measures and PM_{10} Emission Reductions (Tons per Year)

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
City of Yuma	pave 5.74 mi	2000						
	pave 1.73 mi	2001						
	pave 1.0 mi	2001						
	pave 0.25 mi	2001						
	Total							
	8.72 mi		2011	1324	687			
	Chemically Stabilize one 5532x24' street	2001	194		194			
	Watering Shoulders 5436' of 8' shoulder	2001	6.3		6.3			
	Swept 1,183 miles of paved streets	2000 2001	130 130	130	130			
	Install curbs & Sidewalks 0.63 mi 9.89 mi 0.25 mi total of 10.77 mi	 2000 2001 2001	130	8	122			
	Landscaping 5.74 miles of median	2000	0	0	0			
	Burn permits for 63.5 acres of citrus	2000	0	0	0			
	Burn permits for 171 acres of citrus	2001	0	0	0			
	Magnesium chloride on 88575 yds of unpaved rd 87930 sq yds of alleys, 63852 sq yds of city prop	6-03 to 6-05					 39 3.8 1.9	 39 3.8 1.9
	Paved unpaved area of 6835 sq yds						1.1	
	Street sweeping 5100 mi						8	8
	Paved .83 mi of unpaved alleys	2000						

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
	Paved .83 mi of							
	unpaved alleys	2001						
	total of 1.66 mi		7	3.5	3.5			
	Watering unpaved							
	Roads							
City of Somerton	499.75 miles	2000						
	499.75 miles	2001						
	total of 999.5 mi		3064	1532	1532			
	1220 miles	2003					3741	
	1220 miles	2004						3741
	Watering unpaved							
	Shoulders							
	1,820 mi	2000						
	1,820 mi	2001						
	total of 3,640 mi		4376	2188	2188			
	Street sweeping							
	1,211.5 miles in	2000						
	1,211.5 miles in	2001						
	total of 2423 miles		133	66.5	66.5			
	3846 miles	2003					209	209
	3846 miles	2004						
	paved unpaved roads(mi)							
	4.5	2002	830			830		
	Clean up of paved roads							
	water erosion mud,				173			
	trackout areas, material				138			
	Spills			17				
	once per week	2002	3.6		17			
		2003	3.6					
		2004	3.6			3.6	3.6	3.6
	Pave unpaved lots(ft2)							
	505440	2002	6.41			6.41		
	126360							
	4							
	505440							
	Install curbs (mi)							
	0.5	2002	5.5					
	Landscape shoulders (mi)							
	1	2002	11.0					
	1.25	2003	13.7					

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
	0.25	2004	2.7					
						16.4	13.7	2.7
	Paved/stabilized unpaved roads							
	.75 miles paved	2001	173					
	.75 mi chip/seal	2001	138					
	56.2 mi MgCl2	2000	17					
	56.2 mi MgCl2	2001	17					
Yuma	64 mi MgCl2	2004						19
County	1.0 mile paved	2003					231	
	Total		345	17	328			
	Street Sweeping							
	100 miles	2000	10					
	200 miles	2001	23					
	300 miles total			10	23			
	175 miles	2004						20
	Construction of 4515' of an alley-Way	2001	0					
Immigration and Naturalization Service	Water 18 miles of drag Roads	2000						
		2001						
		2002						
		2003						
		2004		7.1	7.1	7.1	7.1	7.1
Yuma County Water Users	Stocked 8,400 white amur fish/year	2000	3.35					
		2001	3.35	3.35	3.35			
		2002	3.35					
		2003	3.35					
		2004	3.35			3.35	3.35	3.35
	Pipelined 1 mi		1.1					
	Maintain 350 no trespassing signs & 50 barricades	2000	10	10				
	Maintain 350 no trespassing signs & 50 barricades	2001	10		10			
	Patrolled & watered 400 miles of unpaved canal roads	2000	82	82				
	Patrolled & watered 400 miles of unpaved canal roads	2001	82		82			
	Pipelined 2 miles of canals	2000	4	4				

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
	3 mi posted/barricaded	2001	4.2		4.2			
	Paved 2.5 mi		3.5					
	1.5 mi fenced off		2.1					
		2002	198.9			397.8		
	Pipelined 0.8 mi		0.8					
	Abandoned 3/8 mi		0.5					
		2003	1.3				2.6	
	Lined 8 mi of canal		8.4					
	Pipelined 1/2 mi		0.5					
		2004	8.9					17.8
N. Gila Irrigation District	20 miles posted	1999	0					
Unit B Irrigation	3 mi posted/baricaded	1999	0					
Bureau of Reclamtion	water 960 miles of canal banks	2003	479				479	479
		2004	479					
Yuma Rural Metro Fire Dept.	permitted open burns on the following acreages							
	600	1999	0					
	8722	2002	0					
	8542	2003	0					
	7794	2004	0					
Marine Corps Air Station	Remove 30 gas Vehicles	2000	0.06	0.06				
	Remove 15 gas Scooters	2001	0.02		0.02			
	pave 140329 ft2 roadway						1.4	1.4
	pave 102112 ft2 parking	half in 2003					0.2	0.2
	Sweeping 2 - 3 days	half in 2004					1.1	1.1
	717221 yd2 runway							
	388952 yd2 taxiway 401090 yd2 aprons121,380 yd2 other							
	stabilize 4800 ft2 desert						0.1	
	stabilize 22500 ft2 desert							
Total				5402	5716	1265	4747.5	4558

As demonstrated in Table 6-1, ADEQ modeled that 5,402 tons of PM_{10} emissions were reduced in 2000; 5,716 tons in 2001; and 1,265 tons in 2002. In 2003, 4,747.5 tons of PM_{10} emissions were reduced and 4,558 tons in 2004.

6.1.1 Stationary Sources

In addition to the control measures implemented in Table 6-1, stationary sources in the Yuma area implemented control measures in 1999, the base year of the Yuma inventory. The control measures that the thirty-three sources were implementing in 1999 were required by state rules that were included in their operating permit conditions issued by ADEQ. These were rules in Articles 6 and 7, where applicable, of the Arizona Administrative Code. Table 6.2 lists these control measures and provides a short description of each. Copies of the text of the control measures are contained in Appendix B.

Table 6.2

Stationary and Portable Sources Control Measures		
Number	**Control Measure**	**Description of Control Measure**
1	R18-2-602	Unlawful Open Burning
2	R18-2-604	Open Areas, Dry Washes or Riverbeds
3	R18-2-605	Roadways and Streets
4	R18-2-606	Material Handling
5	R18-2-607	Storage Piles
6	R18-2-702	General Provisions
7	R18-2-703	Standards of Performance for Existing Fossil-fuel Fired Steam Generators and General Fuel-burning Equipment
8	R18-2-704	Standards of Performance for Incinerators
9	R18-2-710	Standards of Performance for Existing Storage Vessels for Petroleum Liquids
10	R18-2-719	Standards of Performance for Existing Stationary Rotating Machinery
11	R18-2-722	Standards of Performance for Existing Gravel or Crushed Stone Processing Plants
12	R18-2-723	Standards of Performance for Existing Concrete Batch Plants
13	R18-2-724	Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment

Stationary and Portable Sources Control Measures		
Number	**Control Measure**	**Description of Control Measure**
14	R18-2-726	Standards of Performance for Sandblasting Operations
15	R18-2-727	Standards of Performance for Spray Painting Operations
16	R18-2-729	Standards of Performance for Cotton Gins
17	R18-2-730	Standards of Performance for Unclassified Sources
18	R18-2-801	Classification of Mobile Sources
19	R18-2-804	Roadway and Site Cleaning Machinery

Source: Air Quality Division, Planning Section, March, 2003

6.1.2 Best Available Control Measures (BACM) in the Yuma PM_{10} Nonattainment Area

On August 18, 2002, the Yuma area experienced a 24-hour average of 170 ug/m^3. The NAAQS is 150 ug/m^3 for a 24-hour average. An unusually large and intense thunderstorm developed in east-central Sonora, Mexico on the afternoon of August 18, 2002. By evening, the thunderstorm had moved to the northwest through the Yuma area, producing sustained winds in excess of 25 miles per hour with gusts up to 45 miles per hour.[1]

High wind events are a type of natural event covered by EPA's Natural Events Policy (hereafter NEP, Areas Affected by PM-10 Natural Events, Memorandum, 1996, Mary D. Nichols) and Arizona's Policy 0159.00 Air Quality Exceptional and Natural Events. Under these policies, ADEQ developed a natural events action plan (NEAP) to reduce particulates during future high wind events in the Yuma area. The NEP required ADEQ to identify and commit to implement Best Available Control Measures (BACMs) to satisfy the requirements for abating sources of dust. It also required ADEQ to submit a NEAP to the U.S. Environmental Protection Agency (EPA) by February 18, 2004

[1] Wind speeds of 15 miles per hour and greater can suspend surface soil dust into the air.

(eighteen months after the exceedance). ADEQ worked with local governments and stakeholders to develop the Yuma NEAP. The deadline for full implementation of BACMs was August 18, 2005. The BACMs are described below.

6.1.2.1 Yuma Agricultural Best Management Practices Rule

As demonstrated in the Yuma NEAP, a detailed look at the PM_{10} concentrations during the wind event of August 18, 2002, revealed that agricultural fields contributed to 17.7 percent of the concentrations on that day. ADEQ met with stakeholders of the agricultural community over a span of several months in Yuma to develop an AgBMP program in Yuma County. The program is embodied in Arizona Administrative Code R18-2-609, R18-2-612 through 614 (see Appendix C).

An AgBMP rule has been effective in Maricopa County as a dust control measure since May, 2000. The Maricopa County Agricultural BMP rule was approved as BACM by EPA and has been upheld in federal court, which found the flexible format uniquely suited to widely varying farm situations. The BMP rule was adapted to the unique farming conditions of Yuma County. Yuma's topography, soil conditions, crops, and irrigation methods differ substantially from Maricopa County's, and the Yuma County AgBMP was conceived and is being implemented with this in mind. The AgBMP program begin in the Yuma Valley on June 1, 2005, but was not implemented until August 1, 2005.

6.1.2.2 20% Opacity Standard (R18-2-702)

Additional emissions reductions from permitted sources in the Yuma Nonattainment Area are expected as a result of revising Arizona Administrative Code R18-2-702 General Provisions (see Appendix B). R18-2-702, which is the 20% opacity standard, applies to certain categories of permitted sources not covered by a separate opacity limit in other sections of ADEQ rules. ADEQ met with stakeholders on several occasions before revising this rule in 2003 to conform to EPA's requirement for a 20% opacity limit. The 20% opacity limit was effective in nonattainment areas as of February 2, 2004.

6.1.2.3 Unpaved Roads Controls

The Yuma NEAP Technical Support Document (TSD) disclosed that emissions from unpaved roads amounted to 4.0 percent of all the emissions resulting from human activities on August 18, 2002.

In the nonattainment area, the county roadways are primarily the section line roads, some of which are unpaved. Yuma County Public Works Department (YCPWD) has the legal responsibility to water, grade and compact the county unpaved roads in the Yuma Nonattainment Area. YCPWD can maintain, as a courtesy, public highways that were established by June 13, 1975, and all roads established by the Yuma County Board of Supervisors. The maintenance

schedule varies from once every two weeks to once every two months, depending upon the daily traffic on the road. YCPWD increases its maintenance schedule during the vegetable growing season because the roads experience more use during that time.

The agricultural producers water county unpaved roads during the growing season, in addition to the watering by YCPWD. The growers do this extra watering to prevent dust from these roads settling on crops.

Canal roads are a subcategory of unpaved roads found in the Yuma Nonattainment Area. Two principal canals in the nonattainment area are used for water delivery: the East Main Canal and the West Main Canal. Service roads are on both sides of these canals. Traffic can go in either direction on these roads. These canals are owned by the Bureau of Reclamation, but they are maintained by the Yuma County Water Users' Association (YCWUA)[2]. From City 2nd Street to City 21st Street, there is a city bike path and a walkway along the eastside of the East Main Canal. Another problem area is the stretch of the East Main canal road between 16th Street and 24th Street. It has been reported that unauthorized traffic, all terrain vehicles (ATVs), and other suspicious activity is common along this stretch of canal. The City of Yuma routinely receives a number of calls complaining about the unauthorized traffic on this part of the canal. The City plans to expand the bike path and walkway to County 12 Street, but it estimates that this will take 5 years to complete. In the contract that the YCWUA presently has with the City, the city police patrol both sides of the canal.

Barricades have been installed at both sides of County 11 ½ and County 13th Street.

A Yuma County Deputy Sheriff works sixteen to twenty hours a week patrolling the canal roads under the jurisdiction of the YCWUA. In addition, YCWUA maintenance people prohibit unauthorized traffic to use the canal roads.

Track-out resulting mostly from passenger cars is created where the canal roads end at the main roads. The YCWUA routinely waters and grades these roads, which helps to mitigate dust emissions from this source.

To solve the problems of insufficient funds to police the canal roads, ADEQ worked with local governments to establish hotline numbers that the public can use to report the license plate numbers of unauthorized or speeding vehicles on any unpaved roads.

6.1.2.4 Yuma Area Street Sweeping Programs

The City of Yuma has a street sweeping program that is implemented as a matter of policy. The City has five mechanical broom-type sweepers which suit the

[2] BOR and the YCWUA entered into a contract requiring YCWUA to maintain the East Main Canal in 1951.

City's desert and dust-exposed areas. Approximately 240 miles of streets are swept annually in the City of Yuma.

The City of Somerton has a street sweeping program. The City of Somerton has one street sweeper. The City of Somerton, similar to the City of Yuma, operates its street sweeping program as a matter of policy.

Yuma County, similar to the Cities of Yuma and Somerton, has a street sweeping program that is implemented as a matter of policy. Yuma County has one street sweeper. Yuma County staff informed ADEQ that approximately 510 miles of streets are swept annually in Yuma County.

6.1.2.5 Other Commitments

The hotline number mentioned in the Yuma NEAP evolved, during the stakeholder process, into the various complaint numbers listed for the entities in Yuma on the public information pamphlet, *How Can I Protect My Family in Yuma from Dust Pollution* (see Appendix D). The pamphlet is available in both English and Spanish. Any Yuma area citizen can phone in a complaint to the number listed on the pamphlet for the jurisdiction in which he resides.

6.1.2.6 Yuma Public Notification and Education Program

State and local agencies must take appropriate reasonable measures to safeguard public health regardless of the source of PM_{10} emission. Both the NEP and the NEAP outline actions necessary to educate and notify the public of any health related effects due to air quality impacts; these include:

> (1) establish public notification and education programs where the NAAQS are exceeded; and
> (2) maintain these programs to minimize public exposure to such events in the future.

ADEQ assisted stakeholders in Yuma County, including the cities of Yuma and Somerton, in the development a public notification and education program as part of a specific NEAP commitment. Yuma residents were educated regarding the adverse health effects of PM_{10} and, with ADEQ's assistance, identified key stakeholders in the Yuma area to be included in this program. The program focuses on alerting sensitive segments of Yuma's population to potential health threats from exposure to high concentrations of PM_{10} that can trigger asthma, bronchitis, severe coughing, heart attacks, and other life threatening upper respiratory problems if exposed.

To this end, ADEQ and Yuma entities developed an Outreach and Notification Resource List (see Appendix E). A Dust Control Action Forecast (see Appendix F) is sent to potential sources of dust when the 3-day forecast predicts conditions conducive to elevated dust levels so that they can minimize emissions and

reschedule dust-producing activities. Dust Control Action forecasts are distributed by the Arizona Department of Agriculture to Yuma area farmers and by the ADEQ Community Liaison to public works departments and building construction contractors. The Dust Control Action Forecast is utilized by the media, daycare centers, senior centers, and schools to minimize the exposure of sensitive populations to dust in the event of a high-wind event that could increase concentrations of PM_{10}.

In addition, the Cities of Yuma, Somerton, along with Yuma County developed a dust complaint hotline for citizens to report violators [Yuma: (928) 327-4500, Yuma County: (928) 217-3878, Somerton: (928) 627-9876] and ADEQ assisted with the development of educational materials, including the bi-lingual brochure. These materials are disseminated by ADEQ's community liaison for the Southwest region in concert with Yuma County public service announcements, planned speaking events, and other information posted to local and state websites where it can be downloaded for further dissemination. The ADEQ webpage containing these materials can be found at http://www.azdeq.gov/function/education/index.html.

In 2005, Yuma County developed a public service announcement (PSA) that is played on public access stations. The PSA warns Yuma area residents of the health hazards of dust and encourages them to find ways to control dust and minimize their exposure to it.

6.2 Attainment Demonstration Control Measures

The Clean Air Act (CAA) requires that moderate PM_{10} nonattainment area plans include provisions to ensure that reasonably available control measures (RACMs) were implemented by December 10, 1993. The CAA further requires that the plans provide for implementation of controls on PM_{10} sources, by the same deadline, reflecting reasonably available control technology (RACT). RACM and RACT are not required, however, for sources which do not contribute significantly to violations of the 24-hour or annual PM_{10} NAAQS, or if additional controls on the sources would not expedite attainment of the NAAQS. The CAA Section 189(e) requires that the RACT provision apply to the gaseous precursors of PM_{10}, except where EPA determines that such sources do not contribute significantly to PM_{10} levels that exceed the standard.

ADEQ originally began working with the Yuma area stakeholders in 1991 to identify the significant sources of PM_{10} emissions in the Yuma area. The stakeholders included Federal, state, and local agencies, the irrigation districts and the water users' association, and the Indian tribes in the area. ADEQ and the stakeholders identified the control measures that were needed to control these emissions. ADEQ and the Yuma stakeholders identified additional control measures and implemented these measures in the Yuma area by December 10, 1993. The control measures contained in the 1991 state implementation plan (SIP) and the 1994 update to the SIP are contained in Table 6.3. Table 6.4 discloses that it was estimated that these control measures would result in a PM_{10} emissions reduction amounting to 586.4 tons in 1994. In addition to these measures, the Yuma stakeholders implemented addition measures during 1995 – 1999, which

were never incorporated into the SIP. The controls measures are described under the appropriate categories below and are contained in Appendix G.

Table 6-3. Commitments to Reasonably Available Control Measures Adopted in 1991 and 1994 by the Implementing Agencies in the Yuma Moderate PM_{10} Nonattainment Area

RACM DESCRIPTION	1991 COMMITMENTS	1994 COMMITMENTS	CHANGE
Pave or chemically stabilize unpaved roads	Pave: 4 miles	Pave: 43.05 miles	Pave: +39.05 miles
	Chemically stabilize: 0 miles	Chemically stabilize: 15.36 miles	Chemically stabilize: +15.36 miles
Provide for traffic rerouting or rapid clean up of temporary (and not readily preventable) sources of dust on erosion runoff, mud/dirt carryout areas, material spills, skid control sand). Delineate who is responsible for cleanup	Somerton: N/A	Somerton: 6 hours	Somerton: +6 hours
	Yuma: N/A	Yuma: 45 minutes	Yuma: +45 minutes
	Yuma County: N/A	Yuma County: 6 hours	Yuma County: +6 hours
Require dust control plans for construction or land clearing projects	Annual average number of projects: N/A	Annual average number of projects: 48	Annual average number of projects: +48
Pave or stabilize unpaved parking areas	Pave: 0 acres	Pave: 366.5 acres	Pave: +366.5 acres
	Chemically stabilize : 0 acres	Chemically stabilize: 15.4 acres	Chemically stabilize +15.4 acres
Develop traffic reduction plans for unpaved roads. Use of speed bumps, low speed limits, etc., to encourage use of other (paved) roads	Number of miles: 400.0 miles	Number of miles: 542.8 miles	Number of miles: +142.8 miles
Require curbing and pave or stabilize (chemically or with vegetation) shoulders or paved roads	Length of shoulders: 0 feet	Length of shoulders: 1,575 feet	Length of shoulders: +1,575 feet
Require revegetation, chemical stabilization, or other abatement of wind	Landscape: N/A	Landscape: 8.8 acres	Landscape: +8.8 acres

RACM DESCRIPTION	1991 COMMITMENTS	1994 COMMITMENTS	CHANGE
erodible soil, including lands subjected to water mining, abandoned farms, and abandoned construction sites			
Enforce policies and procedures that will have the effect of reducing vehicle miles traveled (VMT) in the nonattainment area	Annual VMT reduction: 0 vehicles	Annual VMT reduction: 50,000	Annual VMT reduction: +50, 000

SOURCE: *Final State Implementation Plan Revision for the Yuma PM_{10} Nonattainment Area, July 1994*

6.2.1 Yuma County Open Burning Program

Table 6.4 discloses that the greatest PM_{10} reduction in the Yuma area by 1994 was achieved through the open burning program. Wheat was being grown on 27,923 acres in the Yuma Nonattainment Area in 1994. Of this amount, the open burning program limits the maximum acreage of wheat that can be burned in any one year to 9,773 acres. Consequently, emissions from open burning were decreased by 293.0 tons in 1994. Yuma Rural Metro Fire Department (Rural Metro) is still administering the open burning program. The agricultural stakeholders in the Yuma area informed ADEQ that as a result of the residential and commercial development that has occurred in the Yuma Valley since 1991, fewer agricultural fields remain to be burned. Rural Metro furnished ADEQ data that revealed that Rural Metro issued only 6 open burn permits to burn 2,926 acres in 2004. In 2005, Rural Metro only issued 3 permits to burn 3,080 acres. The total acreage permitted for open burns in both 2004 and 2005 is substantially lower than the cap of 9,773.

The City of Yuma informed ADEQ that it issued burn permits for 20.5 acres of brush and weeds to be burned in 1998. It issued burn permits for 220 acres of plants, plant material, tree trimmings, and weeds to be burned in 1999.

As the information from Rural Metro and the City of Yuma attests, particulate matter from open burning has diminished substantially since 1991.

6.2.2 Unpaved Roads

The second largest PM_{10} reduction by 1994 was achieved from unpaved roads, according to Table 6.4. These roads were under the jurisdictions of the City of Yuma, Somerton, Yuma County, the local irrigation districts, the Yuma County Water Users' Association (YCWUA), and the Marine Corps Air Station (MCAS) in Yuma. Commitments to control emissions from unpaved roads in the Yuma Valley reduced the regional PM_{10} emissions by 216.6 tons in 1994.

Table 6-4. Reasonably Available Control Measures (RACM) Adopted in the Yuma Moderate PM_{10} Nonattainment Area During 1991–1994 Timeframe

Reasonable Available Control Measure	Total Units in Inventory	Total Units Treated	Treatment Efficiency	Estimated Uncontrolled Emissions Tons/ Year	Estimated Reduction Tons/Year
Yuma County Control Open Burning	27, 923 acres	17,958 acres		455.6	293.0
Pave Unpaved Roads	254 miles	10 miles	0.9	2,063.1	73.1
Stabilize Unpaved Roads		18.3 miles	0.6		88.9
Reduce Traffic on Unpaved Roads	400 miles	400 miles	0.4	292.1	54.6
Pave Parking Areas	33 parking lots	20 parking lots	0.9	60.4	31.1
Stabilize Parking Areas		18.3 miles	0.5		11.9
Travel Reduction Strategies	337,000 vehicle miles traveled (VMT)	50,000 VMT	1.0	105.0	14.9
Temporary Sources of Dust on Paved Roads	data not available	data not available	0.8	16.8	13.4
Dust Control Plans for Construction Land Clearing	500 acres	48 acres	0.9	60.0	5.4
Control Dust on Open Land	10,000 acres	10 acres	0.9	116.8	0.1
Total Estimated Emissions Reduction					**586.4**

SOURCE: *Final State Implementation Plan Revision for the Yuma PM_{10} Nonattainment Area, July 1994, pp. 28-29.*

During the 1995 – 1999 timeframe, the Yuma County Water Users' Association (YCWUA) and the local irrigation districts reduced traffic on the unpaved canal roads by introducing weed-eating fish into the canals and restricting the unauthorized use of the canal roads. The fish ate the weeds in the canals, thereby obviating the need to use heavy equipment to remove weeds. In 1995, YCWUA restocked the canals under its jurisdiction with white amurs (a type of weed-eating fish). In 1996, it restocked the canals with 8,420 white amurs. Beginning in 1997, YCWUA annually restocked its canals with 8,400 white amurs until at least 1999. YCWUA informed ADEQ that they have a continuing restocking program.

YCWUA and the irrigation districts in Yuma Valley restricted unauthorized use of the unpaved canal roads under their respective jurisdictions. These entities closed 1.2 miles of canal road in 1995. They patrolled 400 miles of unpaved canal banks in 1996, 1997, and 1998. They closed 2.4 miles of canal roads in 1999.

YCWUA and the local irrigation districts pipeline added 7/8 of a mile of canal in 1995, 0.5 miles in 1996, 0.64 miles of canal in 1997, and 4 miles of canal in 1999.

YCWUA and the irrigation districts installed no trespass signs and barricades in 1997 to discourage and prevent unauthorized vehicles on Yuma Valley canal roads. They constantly maintain these signs. In 1999, they added 50 "no trespassing" signs to keep unauthorized people and traffic off their canals roads.

City of Yuma, Somerton, and Yuma County have also controlled PM_{10} emissions from unpaved roads during the 1995 – 1999 timeframe. The City of Yuma paved 1.82 miles, 3.0 miles, and 2.0 miles in 1996, 1997, and 1998, respectively. In 1999, the City paved 1.9 miles of unpaved roads. The City watered 390 miles of unpaved roads in 1995. It closed 0.15 miles of unpaved roads in 1998 and closed the same amount in 1999. The City had disclosed that it has an ongoing chemical stabilization program for its unpaved roads. In 1995, the City of Yuma watered 1,820 miles of street shoulders.

The City of Somerton paved an average of 0.83 miles of alley in 1995 and 0.1 miles of alley in 1996. During the 1997 – 1999 timeframe, the City paved an average of 0.83 of unpaved alley annually. In 1997, the City reconstructed 0.2 miles of curb and gutter. It reconstructed 0.34 miles of curb and gutter in 1998. In 1999, it paved 1.77 miles of unpaved roads within its city limits. Beginning in 1995, the City of Somerton watered 1,820 miles of street shoulders annually up to at least 1999. The City watered 1,350 miles of unpaved roads in 1995 and watered 1,560 miles of unpaved roads each year during the 1996 – 1999 timeframe. The City has disclosed that it has an ongoing road watering program.

Yuma County stabilized or chip sealed 9.5 miles of gravel roads in 1995. Yuma County stabilized 5.3 miles of unpaved roads the same year. It also watered 24 miles of unpaved alleys in 1995. In 1996, the County applied calcium lignosulfanate and chip seal to 5 miles of its unpaved roads. It also stabilized 36.8 miles of unpaved roads with magnesium chloride in 1996. It stabilized and chip

sealed 5.7 miles of unpaved roads in 1997. Yuma County stabilized 43 miles of unpaved roads with magnesium chloride in 1997. In 1998, it applied chip seal to 21.5 miles of unpaved road shoulders. It stabilized 86 miles of unpaved roads with magnesium chloride in 1998 and the same amount in 1999. In 1999, Yuma County paved 15 miles of unpaved roads.

The Department of Homeland Security (known as the U.S. Immigration and Naturalization Service at the writing of the original SIP) has some unpaved roads under its jurisdiction. The Department agreed to reduce PM_{10} attributable to dragging unpaved roads to imprint the footprints of illegal aliens entering the United States. In 1995, the Department watered 348.5 miles of gravel roads.[3]

In 2000, MCAS paved 23.5 miles of unpaved roads on its installation. It paved 8,000 square yards of unpaved roads in 2002 and used asphalt milling on 32,800 square yards of unpaved roads in 2003. In 2005, MCAS paved 140,329 square feet of unpaved roads.

MCAS also prevented unauthorized vehicles from using unpaved roads on the air station. Each year during the 2002 – 2005 timeframe, it restricted flight line vehicle access onto 4 miles of unpaved roads on the air station.

MCAS minimized grading and other soil disturbing actions on secondary unpaved roads on the installation. Each year during the 2002 – 2005 timeframe, it maintained speed limit signs limiting the speed on a six mile stretch of unpaved road to 15 miles per hour.

6.2.3 Unpaved Parking Areas

The Cities of Yuma and Somerton committed to controlling dust from a total of 33 unpaved parking lots. The jurisdictions paved some of the parking areas and chemically stabilized others. Adding the emissions reductions from paving and stabilizing unpaved parking areas in Table 6.4 reveals that a combined estimated annual reduction of 43.0 tons of PM_{10} were achieved in 1994.

The City of Yuma paved a number of gravel parking lots in 1996 having a combined total area of 90,000 square feet. In 1997, the City paved a gravel parking lot with an area of 111,250 square feet.

The City of Somerton placed gravel on a dirt parking lot with an area of 83,400 square feet. In 1998, the City of Somerton reconstructed a parking area in 1998 with an area of 13,267 square yards.

In 1997, MCAS paved a 15,000 square foot parking lot. MCAS paved a 475 square yard parking area in 1998. It paved an 813,206 square foot parking area in

[3] This information was obtained through personal communication between ADEQ staff and Homeland Security personnel.

1999. In 2000, it either paved or asphalted a 139,037 square foot unpaved parking lot. MCAS paved a 13,020 square foot parking lot in 2001. In 2004 and 2005, it paved an 81,366 square foot parking area and a 16,760 square foot parking area, respectively.

6.2.4 Travel Reduction Strategies

The Yuma region has a mass transit system. Yuma Metropolitan Planning Organization (YMPO) informed ADEQ that in 2004, the ridership on the region mass transit system increased 88.9%.

MCAS worked with the City of Yuma to create a bicycle path from MCAS to Yuma for the purpose of reducing motor vehicle trips. MCAS constructed 3 miles of bicycle path in 1995. MCAS provides bicycles free of charge to personnel on the installation. It estimated that 2,600 cars were eliminated on their installation in 1995 and 1996 as a result of issuing bicycles to messengers. During the 1997 – 2003 timeframe, this number increased to 5,200 cars per year. In 2004, MCAS eliminated 2,600 cars as a result of bicycle usage.

MCAS also encouraged carpooling and coordination of administrative trips and other off-station trips during the 1991–1994 timeframe. The combined effect of these strategies reduced PM_{10} emissions by 14.9 in 1994. MCAS estimates that off-station trips were reduced by 11,700 cars per year as a result of carpooling and 780 cars a year were eliminated from making off-station trips during the 1995 – 2005.

6.2.5 Temporary Sources of Dust on Paved Roads

The political entities of Yuma, Somerton, and Yuma County committed to providing for traffic rerouting and rapid cleanup of sources of dust on paved roads within their respective jurisdictions. They have done so since December 10, 1993. The control of this source of dust was achieved through the adoption of quick cleanup policies emphasizing the importance of avoidance of spills, quick notification, and rapid cleanup. Table 6.4 shows that an estimated PM_{10} reduction of 13.4 tons was achieved from this source category in 1994.

In addition to their traffic rerouting and rapid cleanup program described above, the political jurisdictions of Yuma, Somerton, and Yuma County operated street sweeping programs during the 1995 – 1999 timeframe. The City swept 183 miles on paved roads each year during the 1995 – 1997 timeframe. The City of Yuma increased street sweeping to 1,183 miles of unpaved roads in 1998. It swept 1,183 miles of unpaved roads in 1999.

The City installed 1.6 miles of gutter and sidewalks along its roads in 1999.

The City of Somerton swept 3,238 miles of paved roads each year during the 1995 – 1999 timeframe.

Yuma County swept 3,238 miles each year during the 1997 – 1999 timeframe. MCAS also has a street sweeping program. Their street sweeping equipment is operated in a manner that minimized dust, including using water during operations. During the 1995 – 2005 timeframe, MCAS swept 1,628,643 square yards of the airfield every year on their installation.

6.2.6 Dust Control Plans for Construction Land Clearing

The jurisdictions of Yuma, Somerton, and Yuma County adopted local laws that require some level of dust mitigation during construction projects. Building permits for projects in the City of Yuma can be obtained through either the zoning department or the public works department, depending upon the type of project. In each case, local law requires that a dust control plan be submitted to the Building Official. Somerton's requirement for dust control plans for construction is similar to the requirement for the City of Yuma. Yuma County also issues building permits. Yuma County adopted requirements similar to the requirements for the City of Yuma. Yuma County has jurisdiction over projects in the unincorporated portions of Yuma County. It was estimated that a reduction of 5.4 tons of PM_{10} per year was achieved through this measure in 1994. The jurisdictions continued these programs during the 1995 – 1999 timeframe.

Arizona Department of Transportation (ADOT) often hires contractors for road construction projects in the Yuma PM_{10} Nonattainment Area. ADOT requires its contractors to adher to local dust control plan requirements.

MCAS posts construction sites of one acre or more on its installation with signage containing dust complaint information. In 2005, this type of signage was used at six construction sites

6.2.7 Control Dust on Open Land

In 1994, it was disclosed that the City of Yuma had a program that required soil stabilization as part of their lot clean up program. The City informed ADEQ that this program is ongoing.

ADEQ entered into a memorandum of understanding (MOU) with MCAS requiring MCAS to control dust emissions from a total of ten acres on its installation. Table 6.4 indicates that an estimated PM_{10} reduction of 0.1 tons per year was achieved from this category.

MCAS provided ADEQ with information with respect to land improvements on the installation. MCAS constructed a medical facility and clinic on their installation in 1996. A concomitant benefit from this construction was a permanent reduction of PM_{10} emissions from 4,200 square feet of open land. In 1997, MCAS developed 1,739 square feet of open land. It developed 96,202 square feet of open land in 1999. In 2000, it developed 25,726 square feet of open

land. In 2003, it covered 750,000 square feet of open ground surrounding the air field with asphalt and developed 2,522,500 square feet of open ground. It developed 85,579 square feet of open ground in 2005. These improvements eliminated substantial PM_{10} emissions.

MCAS informed ADEQ that it landscaped 464,689 square feet of wind erodible land with native plants to prevent or control windblown dust in 1999 and landscaped 39,860 square feet in 2004. MCAS cropped or mowed plants on 63 acres, rather than completely removed, on 63 acres each year during 1995 – 2005.

MCAS also used dust palliatives or liquid surfactants to control dust on their open land. It controlled dust on 1,540,000 square yards by these means in 1997. In 1998, MCAS controlled dust on 163,700 square feet of open land by these means. It used liquid surfactants to control dust on 274,600 square feet of open land in 2000 and on 41,900 square yards in 2002. In 2003 and 2004, MCAS use dust palliatives or liquid surfactants to control dust on 89,100 square yards and on 22,500 square feet, respectively.

MCAS prevented cars from accessing and parking at selected locations on the air station. MCAS limited the size and location of unimproved contractor lay-down areas in 2002 and 2003. Thirty cars per day were prevented from accessing and parking at selected locations on the air station in 2004; twenty cars per day were prevented from accessing and parking at selection locations in 2005.

MCAS controlled soil erosion onto paved road surfaces. MCAS informed ADEQ that it has built 98 storm water retention basins on the installation since 2002.

6.2.8 Removal of Gasoline Powered Vehicles

MCAS also took 26 gasoline powered vehicles out of operation in 2001. However, the PM_{10} emissions reductions resulting from this action were not quantified by ADEQ.

6.2.9 Building Code Amendments

Although the City of Yuma already had dust control requirements for large construction productions since at least 1994, the City modified its Building Code in 1996. ADEQ believes that this modification may have made the Building Code even more effective in reducing PM_{10} emissions associated with building construction in the City of Yuma.

6.3.0 Air Quality Advisory Group

One of the outcomes of the stakeholder process during the 1991 – 1994 timeframe was the formation of an air quality advisory group made up of ADEQ and Yuma area stakeholders. The purposes of the group was to track the effectiveness of the 1991 PM_{10} plan and the 1994 plan update, to analyze the results of implementing

the control measures in the plan, and to recommend additional control measures as necessary and appropriate. In 1995, discussions were being held among the Cities of Yuma and Somerton and Yuma County. The local area stakeholders informed ADEQ that the group was active until at least 1999.

6.3.1 Personnel Trained through Public Outreach

MCAS informed ADEQ that it trained 735 people in air quality issues in 2004 and 560 personnel in 2005.

6.3.2 Enforce State Rules and Laws

Another outcome of the stakeholder process during the 1991 – 1994 timeframe was the commitment by ADEQ and the Arizona Department of Transportation (ADOT) to enforce the rules in the AAC and the Arizona Revised Statutes that related to controlling PM_{10} emissions. These rules are contained in Article 6 of Chapter 2 of Title 18 of the AAC. Although not documented in the SIP, ADEQ and ADOT were enforcing these rules during the 1995 – 1999 timeframe.

6.3.3 Work with Local Federal Agencies and Indian Tribes

During the stakeholder process over the 1991 – 1994 timeframe, ADEQ and ADOT made a commitment to work with the federal agencies and the Cocopah and Quechan Indian Tribes in the Yuma area. ADEQ and ADOT fulfilled this commitment during the 1995 – 1999 timeframe.

6.3.4 Require Haul Trucks To Be Covered

Beginning in 1991, the jurisdictions of the Cities of Yuma and Somerton and Yuma County have seriously considered enforcing R18-2-606. Material Handling as a means to help reduce PM_{10} emissions in the Yuma Valley. Among other things, this rule prohibits a person from transporting or conveying materials likely to result in significant amounts of airborne dust without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. During stakeholder meetings over the last year, the jurisdictions informed ADEQ that their legal counsels have advised that R18-2-606, as written, is too vague to enforce and any attempt to do so would probably not meet with success.

7.0 CONTINGENCY MEASURES AND CONTINUING COMMITMENTS

7.1 Contingency Measures

Section 175A of the CAA requires that a maintenance plan include contingency provisions, as necessary to promptly correct any violation of the NAAQS which may occur after redesignation of the area to attainment. ADEQ is required to implement all measures with respect to the control of PM_{10} in the Yuma area which were contained in the SIP for Yuma before redesignation of the Yuma area to attainment. These contingency measures are distinguished from contingency measures generally required for nonattainment areas under section 172(c)(9). To satisfy this requirement, ADEQ is not required to have fully adopted contingency measures that will take effect without further action by ADEQ in order for this maintenance plan to be approved by EPA. Nevertheless, the contingency measures are considered to be an enforceable part of the SIP. As an integral part of the plan, ADEQ should identify specific indicators, or triggers, which will be used to determine when the contingency measures need to be implemented. The trigger mechanism for the maintenance plan contingency measures is reached when ambient concentrations reach pre-determined threshold levels. A contingency measure or a combination of contingency measures will be implemented if the ambient PM_{10} level in the Yuma PM_{10} Nonattainment Area exceeds 95% of the NAAQS. Consequently, these contingency measures would be activated if the 24-hour average NAAQS reaches 143 ug/m^3 or above or the annual NAAQS reaches 48 ug/m^3 or above.

As with the control measures in Chapter 6, ADEQ began working with the Yuma area stakeholders in 1991 to identify contingency measures that could be implemented in case of a future violation in the Yuma area after its redesignation to attainment. Even more contingency measures were identified by 1994. In addition to these contingency measures, ADEQ and the Yuma area stakeholders developed the Yuma County AgBMP. This rule went into effect on July 18, 2005. The contingency measures for the Yuma area are contained in Table 7-1.

Some paving activities are underway in Yuma but they have not been relied upon in the attainment demonstration. These measures provide additional assurance that the PM_{10} NAAQS will be maintained through 2016 and beyond.

Table 7.1 -- Contingency Measures for the 2005 Yuma PM_{10} Maintenance Plan

CONTINGENCY MEASURE	Area of Applicability	Quantity	Estimated Reduction Tons/Year
Pave all new parking lots	City of Yuma Zoning Requirement (Effective 1979) Yuma County Planning and Zoning Ordinance Part A §906.00 for lots with 25 parking spaces or more (Effective October, 1997)	5 lots per year	0.24 TPY
Chemically stabilize parking lots with more than 6 but less than 25 parking spaces with dust-inhibitor treated ABC	Yuma County Planning and Zoning Ordinance Part B §906.00 (Effective October, 1997)	5 lots per year	0.075 TPY
Require developers to pave all new private roads upon rezoning	Yuma County	12 miles/year	307 TPY
Pave existing unpaved miles of road	Throughout Yuma air quality planning area	City of Yuma: 0.44 mile/year City of Somerton: 0.1 mile/year Yuma County: 1.0 mile/year	78.7 TPY for each paved mile that carries 500 vehicles/day
Chemically stabilize miles of unpaved roads		City of Yuma: 10 City of Somerton: 30 Yuma County: 60 miles/year, twice a year	2,555 TPY

CONTINGENCY MEASURE	Area of Applicability	Quantity	Estimated Reduction Tons/Year
Agricultural Best Management Practices	Based on acres within Planning Area boundaries and Yuma area farming crops/farming practices		2,062 TPY (6 Tons Per Day)[1]
TOTALS			**5,003 TPY**

SOURCE: AQD, Planning Section, 2006

[1] This estimated PM_{10} reductions is derived from the Yuma AgBMPs being implemented on 60,192 non-citrus acres in the Yuma Nonattainment Area. A detailed description of how this number was derived is contained in Appendix C of the Yuma Maintenance Plan Technical Support Document.

Table 7.1 demonstrates that six implemented control measures that were not relied upon in the attainment demonstration result in over 5,000 tons per year of emissions reductions that can be utilized as contingency measures.

ADEQ is aware that EPA will review what constitutes a contingency plan on a case-by-case basis. ADEQ has every expectation that EPA Region IX will approve the contingency plan submitted to EPA as part of this maintenance plan.

7.2 Commitments

7.2.1 CAA Section 110 Continuing Commitments

Section 110(a)(2)(A) of the CAA requires that States provide for enforceable emissions limitations and other control measures, means, or techniques, as well as schedules for compliance with the PM_{10} NAAQS. Chapter 6.0 includes a list of control measures that enabled the Yuma area to reach and maintain attainment. ADEQ commits to enforce these measures to maintain the 24-hour average and annual NAAQS ending in 2016.

Section 110(a)(2)(B) of the CAA requires that States provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, compile, and analyze data on ambient air quality. Under ADEQ's air quality assessment program, ambient monitoring networks for air quality are established to sample pollution in a variety of representative settings, to assess the health and welfare impacts, and to assist in determining air pollution sources. These networks cover both urban and rural areas of the State. The monitoring sites are combined into networks, operated by a number of government agencies and regulated companies. Each network is comprised of one or more monitoring sites, whose data are compared to the NAAQS, as well as being statistically analyzed in a variety of ways. The agency or company operating a monitoring network also tracks data recovery, quality control, and quality assurance parameters for the instruments operated at their various sites. The agency or company often also measures meteorological variables at the monitoring site. Chapter 3.0 presents monitoring network information and data for the Yuma area.

Monitoring data collected as part of ADEQ's air quality assessment program are summarized into the appropriate quarterly or annual averages. The samplers are certified as Federal Reference or Equivalent Methods. Regular checks of the stability, reproducibility, precision, and accuracy of the samplers and laboratory procedures are conducted by either the agency or company network operators. The protocol for PM_{10} monitoring used by the State, local agencies, and companies is established by EPA in the following sections of the Code of Federal Regulations (CFR):

- 40 CFR Part 50, Appendix J, Reference Method for the Determination of Particulate Matter as PM_{10} in the atmosphere;

- 40 CFR Part 50, Appendix K, Interpretation of the National Ambient Air Quality Standards for particulate matter; and

- 40 CFR Part 58, Appendix A, Quality Assurance Requirements for SLAMS
  - Section 2, Quality System Requirements
  - Section 3.3 and 3.4.1, Data Quality Assessment Requirements
  - Section 4.2, Annual Reports
  - 40 CFR Part 58, Appendix D, Section 2.8, Particulate Matter Design Criteria for SLAMS
  - 40 CFR Part 58, Appendix E, Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring, Section 8, Particulate Matter.

ADEQ commits to continue to operate the monitors in the Yuma area according to the references and guidelines referenced above for the duration of this maintenance plan to demonstrate maintenance through 2016.

Section 110 (a)(2)(C), Section 110 (a)(2)(E), Section 110 (a)(2)(F), and Section 110 (a)(2)(L) of the CAA require States to have permitting, compliance, and source reporting authority. Arizona Revised Statutes (ARS) § 49-402 establishes ADEQ's permitting and enforcement authority. As authorized under ARS § 49-402, ADEQ retains adequate funding and employs adequate personnel to administer the air quality program. Appendix A includes the organizational chart for ADEQ's Air Quality Division.

Under ADEQ's air permits program, stationary sources (e.g., businesses, utilities, governmental agencies, and universities) that emit significant amounts of regulated air pollutants are required to obtain a permit before constructing, modifying, replacing, or operating any equipment or process which may cause air pollution. Existing sources are also required to obtain a revision or modification to their permits before transferring ownership, relocating, or otherwise significantly changing the method of their operation. Additionally, ADEQ is responsible for assessing fees based on the actual emissions submitted in the emissions inventory for all sources under ADEQ jurisdiction pursuant to Arizona Administrative Code (AAC) R18-2-326.

State regulations (AAC R18-2-327) require that any source subject to a permit must complete and submit to the Director of ADEQ an annual emissions inventory questionnaire. A current air pollutant emissions inventory of both permitted and non- permitted sources within the State is necessary to properly evaluate air quality program effectiveness, as well as assessing emission fees. ADEQ is responsible for the preparation and submittal of an emissions inventory report to EPA for sources and emission points prescribed in 40 CFR 51.322 and for sources that require a permit under ARS 49-426 for criteria pollutants. This inventory will encompass those sources under State jurisdiction emitting 1

ton/year or more of any individual regulated air pollutant, or 2.5 tons/year or more of any combination of regulated air pollutants. Regulated air pollutant is defined in AAC R18-2-101.98.

Under ADEQ's air quality compliance program, major sources are inspected annually, while minor sources are inspected every two to three years. However, minor sources may be the subject of various initiatives during the year. If a particular sector (e.g., dry cleaners, portable sources) has evidenced problems in the prior year (e.g., failure to submit move notices by portable sources), ADEQ's Air Compliance Section implements initiatives to address the problem (e.g., seminars and workshops for the regulated community explaining the general permit requirements; individual inspections of all portable sources within a geographical area, mailings, etc.). In addition, compliance initiatives are developed to address upcoming or future requirements (e.g., new general permits) and include such actions as training for inspectors; development of checklists and other inspection tools for inspectors; public education workshops; targeted inspections; mailings, etc. ADEQ's Air Compliance Section also has an internal performance measure to respond to all complaints as soon as possible, but no later than within five working days.

Section 110(a)(2)(G) of the CAA requires that States provide for authority to establish emergency powers and authority and contingency measures to prevent imminent endangerment. AAC R18-2-220 prescribes the procedures the Director of ADEQ shall implement in order to prevent the occurrence of ambient air pollution concentrations which would cause significant harm to the public health. As authorized by ARS § 49-426.07, ADEQ may seek injunctive relief upon receipt of evidence that a source or combination of sources is presenting an imminent and substantial endangerment to public health or the environment.

ADEQ commits to continue to follow and enforce the requirements of Section 110 of the CAA for the duration of the maintenance plan.

7.2.2 CAA Section 172 Continuing Commitments

Section 172(c)(1) of the CAA requires that nonattainment plan provisions provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable and demonstrate attainment of the national primary ambient air quality standards. This requirement has been fulfilled. Chapter 6.0 includes a description of RACMs that have been implemented in the Yuma area to control PM_{10} emissions and bring the area into attainment for the PM_{10} NAAQS.

Section 172(c)(3) and Section 172(c)(4) of the CAA require a current inventory of actual emissions from all sources of the relevant pollutant or pollutants and projected emission inventories. This requirement has been fulfilled. The 1999

base year emissions and the 2016 projected emissions for the Yuma Nonattainment Area are contained in Chapter 4.0.

Section 172(c)(5) of the CAA require permits for the construction and operation of new or modified major stationary sources. All new sources and modifications to existing sources in Arizona are subject to State requirements for preconstruction review and permitting pursuant to AAC, Title 18, Chapter 2, Articles 1, 3, 4, and 5. All new major sources and modifications to existing major sources in Arizona are subject to the New Source Review (NSR) provisions of these rules, including Nonattainment Area Analysis (NAA) and Prevention of Significant Deterioration (PSD). The State NSR program was conditionally approved by EPA in 1982, but since then ADEQ's rules have been updated.

7.2.3 CAA Section 176 Continuing Commitments

Section 176(c)(1) of the CAA contains general conformity requirements that currently apply to federal agency-related activities, except transportation projects,[2] in the Yuma PM_{10} Nonattainment Area (see Chapter 2.0). ADEQ commits to work with the federal agencies, federal grant recipients, and federal licensees and permittees in the Yuma area to ensure that the CAA Sections 118 and 176 and Title 40 C.F.R. § 93.150 - 160 will be met for applicable federal projects.

Section 176(c)(2) of the CAA contains transportation conformity requirements (see Chapter 2.0). ADEQ commits to working with the YMPO to ensure that the transportation plans and programs within the Yuma Nonattainment Area conform to the maintenance plan.

7.2.4 CAA Section 189 Continuing Commitments

Section 189 requires the state implementation plan for the Yuma area to include a permit program meeting the requirements of Section 173. Permits are required for the construction and operation of new and modified major stationary sources of PM_{10}. ADEQ commits to continue to fulfill the requirements of the CAA Section 189. This commitment will ensure that all new sources and modifications to existing sources in Arizona are subject to State requirements for preconstruction review and permitting pursuant to AAC, Title 18, Chapter 2, Articles 1, 3, 4, and 5. All new major sources and modifications to existing major sources in Arizona are subject to the New Source Review provisions of these

[2]The Clean Air Act requires that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the Federal Highway Administration or Federal Transit Authority be in conformity with the state implementation plan through a separate process described in the transportation conformity regulation (Title 40 C.F.R., Parts 51 and 93, November 24, 1993, as amended in August and November 1995).

rules, including Nonattainment Area Analysis and Prevention of Significant Deterioration.

Chapter 8 – Public Process Documents

To be completed and inserted upon completion of public process.

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9.0 REFERENCES

ADEQ (1991) – "Final State Implementation Plan for the Yuma PM_{10} Nonattainment Area", Arizona Department of Environmental Quality, November 1991.

ADEQ (1994) – "Final State Implementation Plan Revision for the Yuma PM_{10} Nonattainment Area", Arizona Department of Environmental Quality, July 1994.

ADEQ (2004) – "Natural Events Action Plan for the Yuma PM_{10} Nonattainment Area", Arizona Department of Environmental Quality, February 17, 2004.

Pechan (2002) – "1999 and 2016 Emission Estimates for the Yuma, Arizona PM_{10} Nonattainment Area Maintenance Plan, Final Report", by Pechan and Associates, 2002.

U.S. EPA (1987) – "PM_{10} SIP Development Guideline", U.S. Environmental Protection Agency, OAQPS, EPA-450/2-86-001, Research Triangle Park, NC, June 1987.

U.S. EPA (1992) – "Procedures for Processing Requests to Redesignate Areas to Attainment", John Calcagni, Director, Air Quality Management Division, memorandum dated September 4, 1992.

U.S. EPA (1994) – "PM_{10} Emission Inventory Requirements", U.S. Environmental Protection Agency, OAQPS, Research Triangle Park, NC, September 1994.

U.S. EPA (1995) – "Reasonable Further Progress, Attainment Demonstration, and Related Requirements for Ozone Nonattainment Areas Meeting the Ozone National Ambient Air Quality Standard, John S. Seitz, Director, Office of Air Quality Planning and Standards (MD-10), May 15, 1995.

U.S. EPA (1996) – "Areas Affected by PM-10 Natural Events, Memorandum, 1996, Mary D. Nichols.

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APPENDIX A

Air Quality Division Organization Chart

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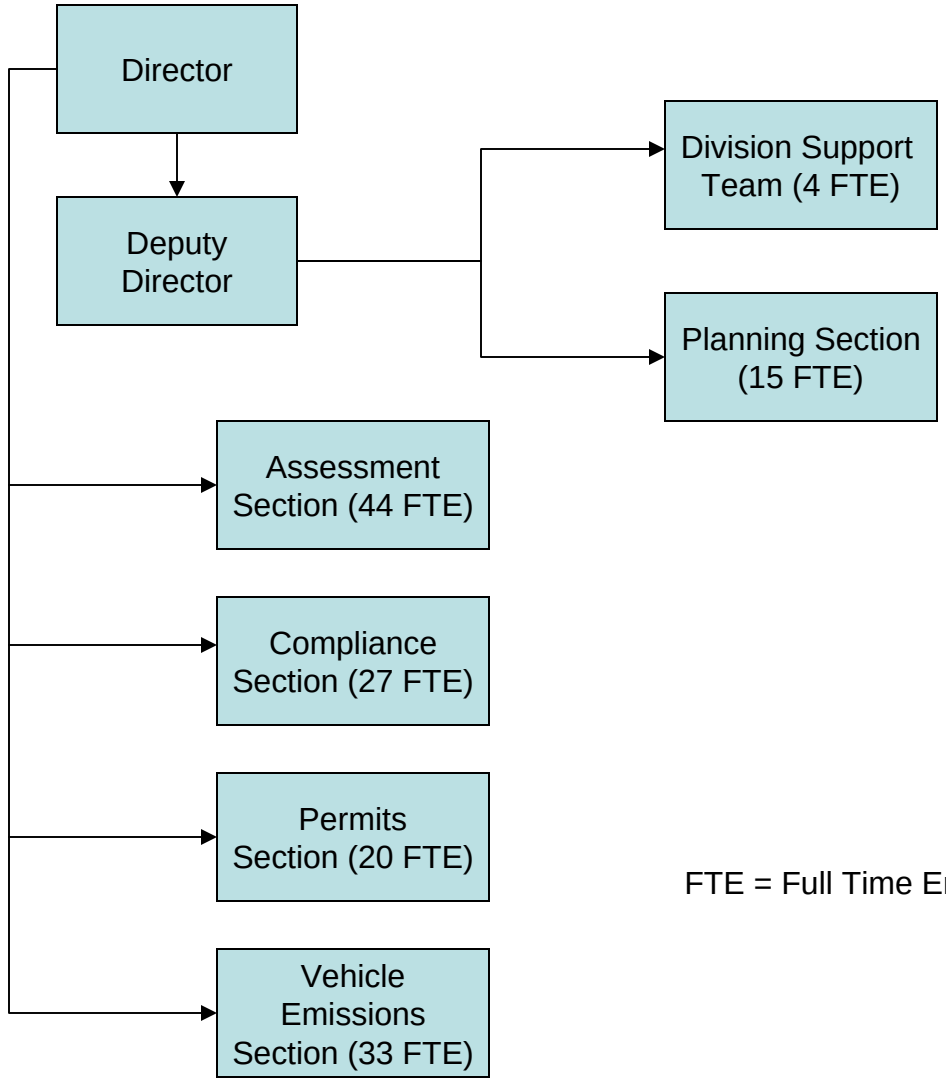
Arizona Dept. of Environmental Quality
Air Quality Division



FTE = Full Time Employees

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APPENDIX B

R18-2-601 through 610 and R18-2-612 through 614

R18-2-701 through 704, 710, 719, 722 through 724, 726, 727, 729, 730

R18-2-801 and 804

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Appendix B.1

R18-2-601 through 610 and R18-2-612 through 614

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TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL
ARTICLE 6. EMISSIONS FROM EXISTING AND NEW NONPOINT SOURCES

Section

R18-2-601. General

For purposes of this Article, any source of air contaminants which due to lack of an identifiable emission point or plume cannot be considered a point source, shall be classified as a nonpoint source. In applying this criteria, such items as air-curtain destructors, heater-planners, and conveyor transfer points shall be considered to have identifiable plumes. Any affected facility subject to regulation under Article 7 of this Chapter or 9 A.A.C. 3, Article 8, shall not be subject to regulation under this Article.

Historical Note

Former Section R9-3-601 repealed, new Section R9-3-601 adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-601 renumbered without change as Section R18-2-601 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-601 renumbered to R18-2-801, new Section R18-2-601 renumbered from R18-2-401 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-602. Unlawful Open Burning

A. In addition to the definitions contained in A.R.S. § 49-501, in this Section:

1. “Agricultural burning” means burning vegetative materials related to producing and harvesting crops and raising animals for the purpose of marketing for profit, or providing a livelihood, but does not include burning of household waste or prohibited materials. A person may conduct agricultural burns in fields, piles, ditch banks, fence rows, or canal laterals for purposes such as weed control, waste

disposal, disease and pest prevention, or site preparation.
2. “Approved waste burner” means an incinerator constructed of fire resistant material with a cover or screen that is closed when in use, and has openings in the sides or top no greater than one inch in diameter.
3. “Class I Area” means any one of the Arizona mandatory federal Class I areas defined in A.R.S. § 49-401.01.
4. “Construction burning” means burning wood or vegetative material from land clearing, site preparation, or fabrication, erection, installation, demolition, or modification of any buildings or other land improvements, but does not include burning household waste or prohibited material.
5. “Dangerous material” means any substance or combination of substances that is capable of causing bodily harm or property loss unless neutralized, consumed, or otherwise disposed of in a controlled and safe manner.
6. “Delegated authority” means any of the following:
a. A county, city, town, air pollution control district, or fire district that has been delegated authority to issue open burning permits by the Director under A.R.S. § 49-501(E); or
b. A private fire protection service provider that has been assigned authority to issue open burning permits by one of the authorities in subsection (A)(6)(a).
7. “Director” means the Director of the Department of Environmental Quality, or designee.
8. “Emission reduction techniques” means methods for controlling emissions from open outdoor fires to minimize the amount of emissions output per unit of area burned.
9. “Flue,” as used in this Section, means any duct or passage for air or combustion gases, such as a stack or chimney.
10. “Household waste” means any solid waste including garbage, rubbish, and sanitary waste from a septic tank that is generated from households including single and multiple family residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas, but does not include construction debris, landscaping rubble, or demolition debris.
11. “Independent authority to permit fires” means the authority of a county to permit fires by a rule adopted under Arizona Revised Statutes, Title 49, Chapter 3, Article 3, and includes only Maricopa, Pima, and Pinal counties.
12. “Open outdoor fire or open burning” means the combustion of material of any type, outdoors and in the open,

where the products of combustion are not directed through a flue. Open outdoor fires include agricultural, residential, prescribed, and construction burning, and fires using air curtain destructors.
13. “Prohibited materials” means nonpaper garbage from the processing, storage, service, or consumption of food; chemically treated wood; lead-painted wood; linoleum flooring, and composite counter-tops; tires; explosives or ammunition; oleanders; asphalt shingles; tar paper; plastic and rubber products, including bottles for household chemicals; plastic grocery and retail bags; waste petroleum products, such as waste crankcase oil, transmission oil, and oil filters; transformer oils; asbestos; batteries; anti-freeze; aerosol spray cans; electrical wire insulation; thermal insulation; polyester products; hazardous waste products such as paints, pesticides, cleaners and solvents,

stains and varnishes, and other flammable liquids; plastic pesticide bags and containers; and hazardous material containers including those that contained lead, cadmium, mercury, or arsenic compounds.
14. “Residential burning” means open burning of vegetative materials conducted by or for the occupants of residential dwellings, but does not include burning household waste or prohibited material.
15. “Prescribed burning” has the same meaning as in R18-2-1501.
B. Unlawful open burning. Notwithstanding any other rule in this Chapter, a person shall not ignite, cause to be ignited, permit to be ignited, allow, or maintain any open outdoor fire in a county without independent authority to permit fires except as provided in A.R.S. § 49-501 and this Section.
C. Open outdoor fires exempt from a permit. The following fires do not require an open burning permit from the Director or a delegated authority:
1. Fires used only for:
a. Cooking of food,
b. Providing warmth for human beings,
c. Recreational purposes,
d. Branding of animals,
e. Orchard heaters for the purpose of frost protection in farming or nursery operations, and
f. The proper disposal of flags under 4 U.S.C. 1, § 8.
2. Any fire set or permitted by any public officer in the performance

of official duty, if the fire is set or permission
given for the following purpose:
a. Control of an active wildfire; or
b. Instruction in the method of fighting fires, except
that the person setting these fires must comply with
the reporting requirements of subsection (D)(3)(f).
3. Fire set by or permitted by the Director of Department of
Agriculture for the purpose of disease and pest prevention
in an organized, area-wide control of an epidemic or
infestation affecting livestock or crops.
4. Prescribed burns set by or assisted by the federal government
or any of its departments, agencies, or agents, or the
state or any of its agencies, departments, or political subdivisions,
regulated under Article 15 of this Chapter.
D. Open outdoor fires requiring a permit.
1. The following open outdoor fires are allowed with an
open burning permit from the Director or a delegated
authority:
a. Construction burning;
b. Agricultural burning;
c. Residential burning;
d. Prescribed burns conducted on private lands without
the assistance of a federal or state land manager as
defined under R18-2-1501;
e. Any fire set or permitted by a public officer in the
performance of official duty, if the fire is set or permission
given for the purpose of weed abatement, or
the prevention of a fire hazard, unless the fire is
exempt from the permit requirement under subsection
(C)(3);
f. Open outdoor fires of dangerous material under subsection
(E);
g. Open outdoor fires of household waste under subsection
(F); and
h. Open outdoor fires that use an air curtain destructor,
as defined in R18-2-101.
2. A person conducting an open outdoor fire in a county
without independent authority to permit fires shall obtain
a permit from the Director or a delegated authority unless
exempted under subsection (C). Permits may be issued
for a period not to exceed one year. A person shall obtain
a permit by completing an ADEQ-approved application
form.
3. Open outdoor fire permits issued under this Section shall
include:
a. A list of the materials that the permittee may burn

under the permit;
b. A means of contacting the permittee authorized by the permit to set an open fire in the event that an order to extinguish the open outdoor fire is issued by the Director or the delegated authority;
c. A requirement that burns be conducted during the following periods, unless otherwise waived or directed by the Director on a specific day basis:
i. Year-round: ignite fire no earlier than one hour after sunrise; and
ii. Year-round: extinguish fire no later than two hours before sunset;
d. A requirement that the permittee conduct all open burning only during atmospheric conditions that:
i. Prevent dispersion of smoke into populated areas;
ii. Prevent visibility impairment on traveled roads or at airports that result in a safety hazard;
iii. Do not create a public nuisance or adversely affect public safety;
iv. Do not cause an adverse impact to visibility in a Class I area; and
v. Do not cause uncontrollable spreading of the fire;
e. A list of the types of emission reduction techniques that the permittee shall use to minimize fire emissions.;
f. A reporting requirement that the permittee shall meet by providing the following information in a format provided by the Director for each date open burning occurred, on either a daily basis on the day of the fire, or an annual basis in a report to the Director or delegated authority due on March 31 for the previous calendar year:
i. The date of each burn;
ii. The type and quantity of fuel burned for each date open burning occurred;
iii. The fire type, such as pile or pit, for each date open burning occurred; and
iv. For each date open burning occurred, the legal location, to the nearest section, or latitude and longitude, to the nearest degree minute, or street address for residential burns;
g. A requirement that the person conducting the open burn notify the local fire-fighting agency or private fire protection service provider, if the service provider is a delegated authority, before burning. If neither

is in existence, the person conducting the burn shall notify the state forester.;
h. A requirement that the permittee start each open outdoor fire using items that do not cause the production of black smoke;
i. A requirement that the permittee attend the fire at all times until it is completely extinguished;
j. A requirement that the permittee provide fire extinguishing equipment on-site for the duration of the burn;

k. A requirement that the permittee ensure that a burning pit, burning pile, or approved waste burner be at least 50 feet from any structure;
l. A requirement that the permittee have a copy of the burn permit on-site during open burning;
m. A requirement that the permittee not conduct open burning when an air stagnation advisory, as issued by the National Weather Service, is in effect in the area of the burn or during periods when smoke can be expected to accumulate to the extent that it will significantly impair visibility in Class I areas;
n. A requirement that the permittee not conduct open burning when any stage air pollution episode is declared under R18-2-220;
o. A statement that the Director, or any other public officer, may order that the burn be extinguished or prohibit burning during periods of inadequate smoke dispersion, excessive visibility impairment, or extreme fire danger; and
p. A list of the activities prohibited and the criminal penalties provided under A.R.S. § 13-1706.
4. The Director or a delegated authority shall not issue an open burning permit under this Section:
a. That would allow burning prohibited materials other than under a permit for the burning of dangerous materials;
b. If the applicant has applied for a permit under this Section to burn a dangerous material which is also hazardous waste under 40 CFR 261, but does not have a permit to burn hazardous waste under 40 CFR 264, or is not an interim status facility allowed to burn hazardous waste under 40 CFR 265; or
c. If the burning would occur at a solid waste facility in

violation of 40 CFR 258.24 and the Director has not issued a variance under A.R.S. § 49-763.01.

E. Open outdoor fires of dangerous material. A fire set for the disposal of a dangerous material is allowed by the provisions of this Section, when the material is too dangerous to store and transport, and the Director has issued a permit for the fire. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The Director shall permit fires for the disposal of dangerous materials only when no safe alternative method of disposal exists, and burning the materials does not result in the emission of hazardous or toxic substances either directly or as a product of combustion in amounts that will endanger health or safety.

F. Open outdoor fires of household waste. An open outdoor fire for the disposal of household waste is allowed by provisions of this Section when permitted in writing by the Director or a delegated authority. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The permittee shall conduct open outdoor fires of household waste in an approved waste burner and shall either:

1. Burn household waste generated on-site on farms or ranches of 40 acres or more where no household waste collection or disposal service is available; or
2. Burn household waste generated on-site where no household waste collection and disposal service is available and where the nearest other dwelling unit is at least 500 feet away.

G. Permits issued by a delegated authority. The Director may delegate authority for the issuance of open burning permits to a county, city, town, air pollution control district, or fire district. A delegated authority may not issue a permit for its own open burning activity. The Director shall not delegate authority to issue permits to burn dangerous material under subsection (E). A county, city, town, air pollution control district, or fire district with delegated authority from the Director may assign that authority to one or more private fire protection service providers that perform fire protection services within the county, city, town, air pollution control district, or fire district. A private fire protection provider shall not directly or indirectly condition the issuance of open burning permits on the applicant being a customer. Permits issued under this subsection shall comply with the requirements in subsection (D)(3) and be in a format prescribed by the Director. Each delegated authority shall:

1. Maintain a copy of each permit issued for the previous five years available for inspection by the Director;
2. For each permit currently issued, have a means of contacting the person authorized by the permit to set an open fire if an order to extinguish open burning is issued; and
3. Annually submit to the Director by May 15 a record of daily burn activity, excluding household waste burn permits, on a form provided by the Director for the previous calendar year containing the information required in subsections (D)(3)(e) and (D)(3)(f).

H. The Director shall hold an annual public meeting for interested parties to review operations of the open outdoor fire program and discuss emission reduction techniques.

I. Nothing in this Section is intended to permit any practice that is a violation of any statute, ordinance, rule, or regulation.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Amended effective October 2, 1979 (Supp. 79-5). Correction, subsection (C) repealed effective October 2, 1979, not shown (Supp. 80-1). Former Section R9-3-602 renumbered without change as Section R18-2-602 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-602 renumbered to R18-2-802, new Section R18-2-602 renumbered from R18-2-401 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 10 A.A.R. 388, effective March 16, 2004 (Supp. 04-1).

R18-2-604. Open Areas, Dry Washes, or Riverbeds

A. No person shall cause, suffer, allow, or permit a building or its appurtenances, or a building or subdivision site, or a driveway, or a parking area, or a vacant lot or sales lot, or an urban or suburban open area to be constructed, used, altered, repaired, demolished, cleared, or leveled, or the earth to be moved or excavated, without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne. Dust and other types of air contaminants shall be kept to a minimum by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means.

B. No person shall cause, suffer, allow, or permit a vacant lot, or an urban or suburban open area, to be driven over or used by motor vehicles, trucks, cars, cycles, bikes, or buggies, or by

animals such as horses, without taking reasonable precautions to limit excessive amounts of particulates from becoming airborne. Dust shall be kept to a minimum by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means.

C. No person shall operate a motor vehicle for recreational purposes in a dry wash, riverbed or open area in such a way as to cause or contribute to visible dust emissions which then cross property lines into a residential, recreational, institutional, educational, retail sales, hotel or business premises. For purposes of this subsection "motor vehicles" shall include, but not be limited to trucks, cars, cycles, bikes, buggies and 3-wheelers. Any person who violates the provisions of this subsection shall be subject to prosecution under A.R.S. § 49-463.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-604 renumbered without change as Section R18-2-604 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-604 renumbered to R18-2-804, new Section R18-2-604 renumbered from R18-2-404 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-605. Roadways and Streets

A. No person shall cause, suffer, allow or permit the use, repair, construction or reconstruction of a roadway or alley without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Dust and other particulates shall be kept to a minimum by employing temporary paving, dust suppressants, wetting down, detouring or by other reasonable means.

B. No person shall cause, suffer, allow or permit transportation of materials likely to give rise to airborne dust without taking reasonable precautions, such as wetting, applying dust suppressants, or covering the load, to prevent particulate matter from becoming airborne. Earth or other material that is deposited by trucking or earth moving equipment shall be removed from paved streets by the person responsible for such deposits.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-605 renumbered without change as Section R18-2-605 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-605 renumbered to R18-2-805, new Section R18-2-605 renumbered from R18-2-405 effective November 15, 1993 (Supp. 93-4).

R18-2-606. Material Handling

No person shall cause, suffer, allow or permit crushing, screening, handling, transporting or conveying of materials or other operations likely to result in significant amounts of airborne dust without taking reasonable precautions, such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-606 renumbered from R18-2-406 effective November 15, 1993 (Supp. 93-4).

R18-2-607. Storage Piles

A. No person shall cause, suffer, allow, or permit organic or inorganic dust producing material to be stacked, piled, or otherwise stored without taking reasonable precautions such as chemical stabilization, wetting, or covering to prevent excessive amounts of particulate matter from becoming airborne.

B. Stacking and reclaiming machinery utilized at storage piles shall be operated at all times with a minimum fall of material and in such manner, or with the use of spray bars and wetting agents, as to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-607 renumbered from R18-2-407 effective November 15, 1993 (Supp. 93-4).

R18-2-608. Mineral Tailings

No person shall cause, suffer, allow, or permit construction of mineral tailing piles without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Reasonable precautions shall mean wetting, chemical stabilization, revegetation or such other measures as are approved by the Director.

Historical Note

Section R18-2-608 renumbered from R18-2-408, new Section R18-2-408 adopted effective November 15, 1993 (Supp. 93-4).

R18-2-609. Agricultural Practices

A person shall not cause, suffer, allow, or permit the performance of agricultural practices outside the Phoenix and Yuma planning areas, as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210, including tilling of land and application of fertilizers without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-609 renumbered from R18-2-409 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 6 A.A.R. 2009, effective May 12, 2000 (Supp. 00-2). Amended by final rulemaking at 11 A.A.R.

2210, effective July 18, 2005 (Supp. 05-2).

R18-2-612. Definitions for R18-2-613

1. “Access restriction” means restricting or eliminating public access to noncropland with signs or physical obstruction.
2. “Aggregate cover” means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.
3. “Artificial wind barrier” means a physical barrier to the wind.
4. “Bed row spacing” means increasing or decreasing the size of a planting bed area to reduce the number of passes and soil disturbance by increasing plant density.
5. “Best management practice” means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM10 emissions from a regulated agricultural activity.
6. “Chemical irrigation” means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.
7. “Combining tractor operations” means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.
8. “Commercial farm” means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Yuma PM10 nonattainment area.
9. “Commercial farmer” means an individual, entity, or joint operation in general control of a commercial farm.
10. “Conservation irrigation” means the use of drips, sprinklers, or underground lines to conserve water, and to reduce the weed population, the need for tillage, and soil compaction.
11. “Conservation tillage” means types of tillage that reduce the number of passes and the amount of soil disturbance.
12. “Cover crop” means plants or a green manure crop grown for seasonal soil protection or soil improvement.
13. “Critical area planting” means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.
14. “Cropland” means land on a commercial farm that:
    a. Is within the time-frame of final harvest to plant emergence;
    b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
    c. Is a turn-row.
15. “Cross-wind ridges” means soil ridges formed by a tillage operation.
16. “Cross-wind strip-cropping” means planting strips of alternating crops within the same field.

17. “Cross-wind vegetative strips” means herbaceous cover established in one or more strips within the same field.
18. “Equipment modification” means modifying agricultural equipment to prevent or reduce particulate matter generation from cropland.
19. “Limited activity during a high-wind event” means performing no tillage or soil preparation activity when the measured wind speed at six feet in height is more than 25 mph at the commercial farm site.
20. “Manure application” means applying animal waste or biosolids to a soil surface.
21. “Mulching” means applying plant residue or other material that is not produced onsite to a soil surface.
22. “Multi-year crop” means a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.
23. “Night farming” means performing regulated agricultural activities at night when moisture levels are higher and winds are lighter.
24. “Noncropland” means any commercial farmland that:
a. Is no longer used for agricultural production;
b. Is no longer suitable for production of crops;
c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or
d. Includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head.
25. “Permanent cover” means a perennial vegetative cover on cropland.
26. “Planting based on soil moisture” means applying water to soil before performing planting operations.
27. “Precision farming” means use of satellite navigation to calculate position in the field, to reduce overlap during field operations, and allow operations to occur during nighttime and inclement weather, thus generating less PM10.
28. “Reduce vehicle speed” means operating farm vehicles or farm equipment on unpaved farm roads at speeds not to exceed 20 mph.
29. “Reduced harvest activity” means reducing the number of harvest passes using a mechanized method to cut and remove crops from a field.

30. “Regulated agricultural activity” means a commercial farming practice that may produce PM10 within the Yuma

PM10 nonattainment area.
31. “Residue management” means managing the amount and distribution of crop and other plant residues on a soil surface.
32. “Sequential cropping” means growing crops in a sequence that minimizes the amount of time bare soil is exposed on a field.
33. “Surface roughening” means manipulating a soil surface to produce or maintain clods.
34. “Synthetic particulate suppressant” means a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, and polyacrylamide, an emulsion of a petroleum product, and an enzyme product that is used to control particulate matter.
35. “Tillage and harvest” means any mechanical practice that physically disturbs cropland or crops on a commercial farm.
36. “Tillage based on soil moisture” means applying water to soil before or during tillage, or delaying tillage to coincide with precipitation.
37. “Timing of a tillage operation” means performing tillage operations at a time that will minimize the soil’s susceptibility to generate PM10.
38. “Transgenic crops” means the use of genetically modified crops such as “herbicide ready” crops, which reduces the need for tillage or cultivation operations, and reduces soil disturbance.
39. “Track-out control system” means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road.
40. “Tree, shrub, or windbreak planting” means providing a woody vegetative barrier to the wind.
41. “Watering” means applying water to noncropland.
42. “Yuma PM10 nonattainment area” means the Yuma PM10 planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.

Historical Note

New Section R18-2-612 renumbered from R18-2-610 at 6 A.A.R. 2009, effective May 12, 2000 (Supp. 00-2). Former Section R18-2-612 renumbered to R18-2-614; new Section R18-2-612 made by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

R18-2-613. Yuma PM10 Nonattainment Area; Agricultural Best Management Practices

A. A commercial farmer shall comply with this Section by August 1, 2005.

B. A commercial farmer who begins a regulated agricultural

activity after August 1, 2005, shall comply with this Section within 60 days after beginning the regulated agricultural activity.

C. A commercial farmer shall implement at least one of the best management practices from each of the following categories at each commercial farm:

1. Tillage and harvest, subsection (E);
2. Noncropland, subsection (F); and
3. Cropland, subsection (G).

D. A commercial farmer shall ensure that the implementation of each selected best management practice does not violate any other local, state, or federal law.

E. A commercial farmer shall implement at least one of the following best management practices to reduce PM10 emissions from tillage and harvest:

1. Bed row spacing,
2. Chemical irrigation,
3. Combining tractor operations,
4. Conservation irrigation,
5. Conservation tillage,
6. Equipment modification,
7. Limited activity during a high-wind event,
8. Multi-year crop,
9. Night farming,
10. Planting based on soil moisture,
11. Precision farming,
12. Reduced harvest activity,
13. Tillage based on soil moisture,
14. Timing of a tillage operation, or
15. Transgenic crops.

F. A commercial farmer shall implement at least one of the following best management practices to reduce PM10 emissions from noncropland:

1. Access restriction;
2. Aggregate cover;
3. Artificial wind barrier;
4. Critical area planting;
5. Manure application;
6. Reduce vehicle speed;
7. Synthetic particulate suppressant;
8. Track-out control system;
9. Tree, shrub, or windbreak planting; or
10. Watering.

G. A commercial farmer shall implement at least one of the following best management practices to reduce PM10 emissions from cropland:

1. Artificial wind barrier;

2. Cover crop;
3. Cross-wind ridges;
4. Cross-wind strip-cropping;
5. Cross-wind vegetative strips;
6. Manure application;
7. Mulching;
8. Multi-year crop;
9. Permanent cover;
10. Planting based on soil moisture;
11. Precision farming;
12. Residue management;
13. Sequential cropping;
14. Surface roughening; or
15. Tree, shrub, or windbreak planting.

H. A person may develop different practices not contained in subsections (E), (F), or (G) that reduce PM10. A person may submit practices that are proven effective through on-farm demonstration trials to the Director. The Director shall review the submitted practices.

I. A commercial farmer shall maintain records demonstrating compliance with this Section. The commercial farmer shall provide the records to the Director within two business days of written notice to the commercial farmer. The records shall contain:

1. The name of the commercial farmer,
2. The mailing address or physical location of the commercial farm, and
3. The best management practices selected for tillage and harvest, noncropland, and cropland by the commercial farmer, and the date each best management practice was implemented.

Historical Note

New Section made by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

R18-2-614. Evaluation of Nonpoint Source Emissions

Opacity of an emission from any nonpoint source shall not be greater than 40% measured according to the Arizona Testing Manual, Reference Method 9. An open fire permitted under R18-2-602 or regulated under Article 15 is exempt from this requirement.

Historical Note

Section R18-2-614 renumbered from R18-2-612; amended by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

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Appendix B.2

R18-2-701 through 704, 710, 719, 722 through 724, 726, 727, 729, 730

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TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL
ARTICLE 7. EXISTING STATIONARY SOURCE PERFORMANCE STANDARDS

Section

ARTICLE 7. EXISTING STATIONARY SOURCE PERFORMANCE STANDARDS

R18-2-701. Definitions

For purposes of this Article:

1. “Acid mist” means sulfuric acid mist as measured in the Arizona Testing Manual and 40 CFR 60, Appendix A.
2. “Architectural coating” means a coating used commercially or industrially for residential, commercial or industrial buildings and their appurtenances, structural steel, and other fabrications such as storage tanks, bridges, beams and girders.
3. “Asphalt concrete plant” means any facility used to manufacture asphalt concrete by heating and drying aggregate and mixing with asphalt cements. This is limited to facilities, including drum dryer plants that introduce asphalt into the dryer, which employ two or more of the following processes:
   a. A dryer.
   b. Systems for screening, handling, storing, and weighing

hot aggregate.
c. Systems for loading, transferring, and storing mineral filler.
d. Systems for mixing asphalt concrete.
e. The loading, transferring, and storage systems associated with emission control systems.
4. “Black liquor” means waste liquor from the brown stock washer and spent cooking liquor which have been concentrated in the multiple-effect evaporator system.
5. “Calcine” means the solid materials produced by a lime plant.
6. “Concentrate” means enriched copper ore recovered from the froth flotation process.
7. “Concentrate dryer” means any facility in which a copper sulfide ore concentrate charge is heated in the presence of air to eliminate a portion of the moisture from the charge, provided less than 5% of the sulfur contained in the charge is eliminated in the facility.
8. “Concentrate roaster” means any facility in which a copper sulfide ore concentrate is heated in the presence of air to eliminate 5% or more of the sulfur contained in the charge.
9. “Condensate stripper system” means a column, and associated condensers, used to strip, with air or steam, TRS compounds from condensate streams from various processes within a kraft pulp mill.
10. “Control device” means the air pollution control equipment used to remove particulate matter or gases generated by a process source from the effluent gas stream.
11. “Converter” means any vessel to which copper matte is charged and oxidized to copper.
12. “Facility” means an identifiable piece of stationary process equipment along with all associated air pollution equipment.
13. “Fugitive dust” means fugitive emissions of particulate matter.
14. “High sulfur oil” means fuel oil containing 0.90% or more by weight of sulfur.
15. “Lime kiln” means a unit used to calcinate lime rock or kraft pulp mill lime mud, which consists primarily of calcium carbonate, into quicklime, which is calcium oxide.
16. “Low sulfur oil” means fuel oil containing less than 0.90% by weight of sulfur.
17. “Matte” means a metallic sulfide made by smelting copper sulfide ore concentrate or the roasted product of copper sulfide ores.

18. “Miscellaneous metal parts and products” for purposes of industrial coating include all of the following:
a. Large farm machinery, such as harvesting, fertilizing and planting machines, tractors, and combines;
b. “Small farm machinery, such as lawn and garden tractors, lawn mowers, and rototillers;
c. Small appliances, such as fans, mixers, blenders, crock pots, dehumidifiers, and vacuum cleaners;
d. Commercial machinery, such as office equipment, computers and auxiliary equipment, typewriters, calculators, and vending machines;
e. Industrial machinery, such as pumps, compressors, conveyor components, fans, blowers, and transformers;
f. Fabricated metal products, such as metal-covered doors and frames;
g. Any other industrial category which coats metal parts or products under the Code in the “Standard Industrial Classification Manual, 1987” of Major Group 33 (primary metal industries), Major Group 34 (fabricated metal products), Major Group 35 (non-electric machinery), Major Group 36 (electrical machinery), Major Group 37 (transportation equipment), Major Group 38 (miscellaneous instruments), and Major Group 39 (miscellaneous manufacturing industries), except all of the following:
i. Automobiles and light-duty trucks;
ii. Metal cans;
iii. Flat metal sheets and strips in the form of rolls or coils;
iv. Magnet wire for use in electrical machinery;
v. Metal furniture;
vi. Large appliances;
vii. Exterior of airplanes;
viii. Automobile refinishing;
ix. Customized top coating of automobiles and trucks, if production is less than 35 vehicles per day;
x. Exterior of marine vessels.
19. “Multiple-effect evaporator system” means the multipleeffect evaporators and associated condenser and hotwell used to concentrate the spent cooking liquid that is separated from the pulp.
20. “Neutral sulfite semichemical pulping” means any operation in which pulp is produced from wood by cooking or digesting wood chips in a solution of sodium sulfite and sodium bicarbonate, followed by mechanical defibrating

or grinding.
21. “Petroleum liquids” means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Number 2 through Number 6 fuel oils as specified in ASTM D-396-90a (Specification for Fuel Oils), gas turbine fuel oils Numbers 2-GT through 4-GT as specified in ASTM D-2880-90a (Specification for Gas Turbine Fuel Oils), or diesel

fuel oils Numbers 2-D and 4-D as specified in ASTM D-975-90 (Specification for Diesel Fuel Oils).
22. “Process source” means the last operation or process which produces an air contaminant resulting from either:
a. The separation of the air contaminants from the process material, or
b. The conversion of constituents of the process materials into air contaminants which is not an air pollution abatement operation.
23. “Process weight” means the total weight of all materials introduced into a process source, including fuels, where these contribute to pollution generated by the process.
24. “Process weight rate” means a rate established pursuant to R18-2-702(E).
25. “Recovery furnace” means the unit, including the directcontact evaporator for a conventional furnace, used for burning black liquor to recover chemicals consisting primarily of sodium carbonate and sodium sulfide.
26. “Reid vapor pressure” means the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D-323-90 (Test Method for Vapor Pressure of Petroleum Products) (Reid Method).
27. “Reverbatory smelting furnace” means any vessel in which the smelting of copper sulfide ore concentrates or calcines is performed and in which the heat necessary for smelting is provided primarily by combustion of a fossil fuel.
28. “Rotary lime kiln” means a unit with an included rotary drum which is used to produce a lime product from limestone by calcination.
29. “Slag” means fused and vitrified matter separated during the reduction of a metal from its ore.
30. “Smelt dissolving tank” means a vessel used for dissolving the smelt collected from the kraft mill recovery furnace.

31. “Smelter feed” means all materials utilized in the operation of a copper smelter, including metals or concentrates, fuels and chemical reagents, calculated as the aggregate sulfur content of all fuels and other feed materials whose products of combustion and gaseous by-products are emitted to the atmosphere.
32. “Smelting” means processing techniques for the smelting of a copper sulfide ore concentrate or calcine charge leading to the formation of separate layers of molten slag, molten copper, or copper matte.
33. “Smelting furnace” means any vessel in which the smelting of copper sulfide ore concentrates or calcines is performed and in which the heat necessary for smelting is provided by an electric current, rapid oxidation of a portion of the sulfur contained in the concentrate as it passes through an oxidizing atmosphere, or the combustion of a fossil fuel.
34. “Standard conditions” means a temperature of 293K (68° F or 20° C) and a pressure of 101.3 kilopascals (29.92 in. Hg or 1013.25 mb).
35. “Supplementary control system” (SCS) means a system by which sulfur dioxide emissions are curtailed during periods when meteorological conditions conducive to ground-level concentrations in excess of ambient air quality standards for sulfur dioxide either exist or are anticipated.
36. “Vapor pressure” means the pressure exerted by the gaseous form of a substance in equilibrium with its liquid or solid form.

Historical Note

Former Section R18-2-701 repealed effective September 26, 1990 (Supp. 90-3). New Section R18-2-701 renumbered from R18-2-501 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-702. General Provisions

A. The provisions of this Article shall only apply to a source that is all of the following:
1. An existing source, as defined in R18-2-101;
2. A point source. For the purposes of this Section, “point source” means a source of air contaminants that has an identifiable plume or emissions point; and
3. A stationary source, as defined in R18-2-101.

B. Except as otherwise provided in this Chapter relating to specific types of sources, the opacity of any plume or effluent, from a source described in subsection (A), as determined by Reference Method 9 in 40 CFR 60, Appendix A, shall not be:

1. Greater than 20% in an area that is nonattainment or maintenance for any particulate matter standard, unless an alternative opacity limit is approved by the Director and the Administrator as provided in subsections (D) and (E), after February 2, 2004;
2. Greater than 40% in an area that is attainment or unclassifiable for each particulate matter standard; and
3. After April 23, 2006, greater than 20% in any area that is attainment or unclassifiable for each particulate matter standard except as provided in subsections (D) and (E).

C. If the presence of uncombined water is the only reason for an exceedance of any visible emissions requirement in this Article, the exceedance shall not constitute a violation of the applicable opacity limit.

D. A person owning or operating a source may petition the Director for an alternative applicable opacity limit. The petition shall be submitted to ADEQ by May 15, 2004.

1. The petition shall contain:

a. Documentation that the affected facility and any associated air pollution control equipment are incapable of being adjusted or operated to meet the applicable opacity standard. This includes:

i. Relevant information on the process operating conditions and the control devices operating conditions during the opacity or stack tests;

ii. A detailed statement or report demonstrating that the source investigated all practicable means of reducing opacity and utilized control technology that is reasonably available considering technical and economic feasibility; and

iii. An explanation why the source cannot meet the present opacity limit although it is in compliance with the applicable particulate mass emission rule.

b. If there is an opacity monitor, any certification and audit reports required by all applicable subparts in 40 CFR 60 and in Appendix B, Performance Specification 1.

c. A verification by a responsible official of the source of the truth, accuracy, and completeness of the petition. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

2. If the unit for which the alternative opacity standard is being applied is subject to a stack test, the petition shall

also include:
a. Documentation that the source conducted concurrent EPA Reference Method stack testing and visible

emissions readings or is utilizing a continuous opacity monitor. The particulate mass emission test results shall clearly demonstrate compliance with the applicable particulate mass emission limitation by being at least 10% below that limit. For multiple units that are normally operated together and whose emissions vent through a single stack, the source shall conduct simultaneous particulate testing of each unit. Each control device shall be in good operating condition and operated consistent with good practices for minimizing emissions.
b. Evidence that the source conducted the stack tests according to R18-2-312, and that they were witnessed by the Director or the Director's agent or representative.
c. Evidence that the affected facility and any associated air pollution control equipment were operated and maintained to the maximum extent practicable to minimize the opacity of emissions during the stack tests.
3. If the source for which the alternative opacity standard is being applied is located in a nonattainment area, the petitioner shall include all the information listed in subsections (D)(1) and (D)(2), and in addition:
a. In subsection (D)(1)(a)(ii), the detailed statement or report shall demonstrate that the alternative opacity limit fulfills the Clean Air Act requirement for reasonably available control technology; and
b. In subsection (D)(2)(b), the stack tests shall be conducted with an opportunity for the Administrator or the Administrator's agent or representative to be present.
E. If the Director receives a petition under subsection (D) the Director shall approve or deny the petition as provided below by October 15, 2004:
1. If the petition is approved under subsection (D)(1) or (D)(2), the Director shall include an alternative opacity limit in a proposed significant permit revision for the source under R18-2-320 and R18-2-330. The proposed alternative opacity limit shall be set at a value that has been demonstrated during, and not extrapolated from,

testing, except that an alternative opacity limit under this Section shall not be greater than 40%. For multiple units that are normally operated together and whose emissions vent through a single stack, any new alternative opacity limit shall reflect the opacity level at the common stack exit, and not individual in-duct opacity levels.
2. If the petition is approved under subsection (D)(3), the Director shall include an alternative opacity limit in a proposed revision to the applicable implementation plan, and submit the proposed revision to EPA for review and approval. The proposed alternative opacity limit shall be set at a value that has been demonstrated during, and not extrapolated from, testing, except that the alternative opacity limit shall not be greater than 40%.
3. If the petition is denied, the source shall either comply with the 20% opacity limit or apply for a significant permit revision to incorporate a compliance schedule under R18-2-309(5)(c)(iii) by April 23, 2006.
4. A source does not have to petition for an alternative opacity limit under subsection (D) to enter into a revised compliance schedule under R18-2-309(5)(c).
F. The Director, Administrator, source owner or operator, inspector or other interested party shall determine the process weight rate, as used in this Article, as follows:
1. For continuous or long run, steady-state process sources, the process weight rate is the total process weight for the entire period of continuous operation, or for a typical portion of that period, divided by the number of hours of the period, or portion of hours of that period.
2. For cyclical or batch process sources, the process weight rate is the total process weight for a period which covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during the period.

Historical Note

Former Section R18-2-702 repealed effective September 26, 1990 (Supp. 90-3). New Section R18-2-702 renumbered from R18-2-502 and amended effective November 15, 1993 (Supp. 93-4). Amended by exempt rulemaking at 9 A.A.R. 5550, effective February 3, 2004 (Supp. 03-4).

R18-2-703. Standards of Performance for Existing Fossil-fuel Fired Steam Generators and General Fuel-burning Equipment

A. This Section applies to the following:
1. Installations in which fuel is burned for the primary purpose of producing power, steam, hot water, hot air or other liquids, gases or solids and in the course of doing so

the products of combustion do not come into direct contact with process materials. When any products or byproducts of a manufacturing process are burned for the same purpose or in conjunction with any fuel, the same maximum emission limitation shall apply, except for wood waste burners as regulated under R18-2-704.
2. All fossil-fuel fired steam generating units or general fuel burning equipment which are greater than or equal to 73 megawatts capacity.
B. For purposes of this Section, the heat input shall be the aggregate heat content of all fuels whose products of combustion pass through a stack or other outlet. The heat content of solid fuel shall be determined in accordance with R18-2-311. Compliance tests shall be conducted during operation at the nominal rated capacity of each unit.
C. No person shall cause, allow or permit the emission of particulate matter in excess of the amounts calculated by one of the following equations:
1. For equipment having a heat input rate of 4200 million Btu per hour or less, the maximum allowable emissions shall be determined by the following equation:
E = 1.02Q0.769
where:
E = the maximum allowable particulate emissions rate in pounds-mass per hour.
Q = the heat input in million Btu per hour.
2. For equipment having a heat input rate greater than 4200 million Btu/hr, the maximum allowable emissions shall be determined by the following equation:
E = 17.0Q0.432
where “E” and “Q” have the same meaning as in subsection (C)(1).
D. For reference purposes only, the two equations in subsection (C) are plotted in Appendix 11, Figure 1. The emission values obtained from the graph are approximately correct for the heat input rates shown. However, the actual values shall be calculated from the applicable equations and rounded off to two decimal places.
E. When low sulfur oil is fired:
1. Existing fuel-burning equipment or steam-power generating installations which commenced construction or a major modification prior to May 30, 1972, shall not emit more than 1.0 pounds sulfur dioxide maximum three

hour average, per million Btu (430 nanograms per joule) heat input.

2. Existing fuel-burning equipment or steam-power generating installations which commenced construction or a major modification after May 30, 1972, shall not emit more than 0.80 pounds of sulfur dioxide maximum threehour average per million Btu (340 nanograms per joule) heat input.

F. When high sulfur oil is fired, all existing steam-power generating and general fuel-burning installations which are subject to the provisions of this Section shall not emit more than 2.2 pounds of sulfur dioxide maximum three-hour average per million Btu (946 nanograms per joule) heat input.

G. When solid fuel is fired:

1. Existing general fuel-burning equipment and steampower generating installations which commenced construction or a major modification prior to May 30, 1972, shall not emit more than 1.0 pounds of sulfur dioxide maximum three-hour average, per million Btu (430 nanograms per joule) heat input.

2. Existing general fuel-burning equipment and steampower generating installations which commenced construction or a major modification after May 30, 1972, shall not emit more than 0.80 pounds, maximum threehour average, per million Btu (340 nanograms per joule) heat input.

H. Any permit issued for the operation of an existing source, or any renewal or modification of such a permit, shall include a condition prohibiting the use of high sulfur oil by the permittee, unless the applicant demonstrates to the satisfaction of the Director that sufficient quantities of low sulfur oil are not available for use by the source and that it has adequate facilities and contingency plans to ensure that the sulfur dioxide ambient air quality standards set forth in R18-2-202 will not be violated.

1. The terms of the permit may authorize the use of high sulfur oil under such conditions as are justified.

2. In cases where the permittee is authorized to use high sulfur oil, it shall submit to the Department monthly reports detailing its efforts to obtain low sulfur oil.

3. When the conditions justifying the use of high sulfur oil no longer exists, the permit shall be modified accordingly.

4. Nothing in this Section shall be construed as allowing the use of a supplementary control system or other form of dispersion technology.

I. Existing steam-power generating installations which commenced

construction or a major modification after May 30, 1972, shall not emit nitrogen oxides in excess of the following amounts:

1. 0.20 pounds of nitrogen oxides, maximum three-hour average, calculated as nitrogen dioxide, per million Btu heat input when gaseous fossil fuel is fired.
2. 0.30 pounds of nitrogen oxides, maximum three-hour average, calculated as nitrogen dioxide, per million Btu heat input when liquid fossil fuel is fired.
3. 0.70 pounds of nitrogen oxides, maximum three-hour average, calculated as nitrogen dioxide, per million Btu heat input when solid fossil fuel is fired.

J. Emission and fuel monitoring systems, where deemed necessary by the Director for sources subject to the provisions of this Section shall, conform to the requirements of R18-2-313.

K. The applicable reference methods given in the Appendices to 40 CFR 60 shall be used to determine compliance with the standards as prescribed in subsections (C) through (G) and (I). All tests shall be run at the heat input calculated under subsection (B).

Historical Note

Former Section R18-2-703 repealed effective September 26, 1990 (Supp. 90-3). New Section R18-2-703 renumbered from R18-2-503 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-704. Standards of Performance for Incinerators

A. No person shall cause, allow or permit to be emitted into the atmosphere, from any type of incinerator, smoke, fumes, gases, particulate matter or other gas-borne material which exceeds 20% opacity except during the times specified in subsection (D).

B. No person shall cause, allow or permit the discharge of particulate matter into the atmosphere in any one hour from any incinerator, in excess of the following limits:

1. For multiple chamber incinerators, controlled atmosphere incinerators, fume incinerators, afterburners or other unspecified types of incinerators, emissions shall not exceed 0.1 grain per cubic foot, based on dry flue gas at standard conditions, corrected to 12% carbon dioxide.
2. For wood waste burners other than air curtain destructors, emissions discharged from the stack or burner top opening shall not exceed 0.2 grain per cubic foot, based on dry flue gas at standard conditions, corrected to 12% carbon dioxide.

C. Air curtain destructors shall not be used within 500 feet of the dearest dwelling.

D. Incinerators shall be exempt from the opacity and emission requirements described in subsections (A) and (B) as follows:
1. For multiple chamber incinerators, controlled atmosphere incinerators, fume incinerators, afterburners or other unspecified types of incinerators, such exemption shall be for not more than 30 seconds in any 60-minute period.
2. Wood waste burners shall be exempt both:
a. For a period once each day for the purpose of building a new fire but not to exceed 60 minutes, and
b. For an upset of operations not to exceed three minutes in any 60-minute period.
E. The owner or operator of any incinerator subject to the provisions of this Section shall record the daily charging rates and hours of operation.
F. The test methods and procedures required by this Section are as follows:
1. The reference methods in 40 CFR 60, Appendix A, shall be used to determine compliance with the standards prescribed in subsection (B) as follows:
a. Method 5 for the concentration of particulate matter and the associated moisture content;
b. Method 1 for sample and velocity traverses;
c. Method 2 for velocity and volumetric flow rate;
d. Method 3 for gas analysis and calculation of excess air, using the integrated sampling technique.
2. For Method 5, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be 0.85 dscm (30.0 dscf) except that smaller sampling times or sample volumes, when necessitated by process variables or other factors, may be approved by the Director.

Historical Note
Former Section R18-2-704 repealed effective September 26, 1990 (Supp. 90-3). New Section R18-2-704 renumbered from R18-2-504 effective November 15, 1993

(Supp. 93-4).

R18-2-710. Standards of Performance for Existing Storage Vessels for Petroleum Liquids

A. No person shall place, store or hold in any reservoir, stationary tank or other container having a capacity of 40,000 (151,400 liters) or more gallons any petroleum liquid having a vapor pressure of 1.5 pounds per square inch absolute or greater

under actual storage conditions, unless such tank, reservoir or other container is a pressure tank maintaining working pressure sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere, or is equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:

1. A floating roof consisting of a pontoon type double-deck type roof resting on the surface of the liquid contents and equipped with a closure seal to close the space between the roof eave and tank wall and a vapor balloon or vapor dome, designed in accordance with accepted standards of the petroleum industry. The control equipment shall not be used if the petroleum liquid has a vapor pressure of 12 pounds per square inch absolute or greater under actual storage conditions.

a. All tank gauging and sampling devices shall be gastight except when gauging or sampling is taking place.

b. There shall be no visible holes, tears, or other openings in the seal or any seal fabric. Where applicable, all openings except drains shall be equipped with a cover, seal, or lid. The cover, seal, or lid shall be in a closed position at all times, except when the device is in actual use.

c. Automatic bleeder vents shall be closed at all times, except when the roof is floated off or landed on the roof leg supports.

d. Rim vents, if provided, shall be set to open when the roof is being floated off the roof leg supports, or at the manufacturer's recommended setting.

2. Other equipment proven to be of equal efficiency for preventing discharge of hydrocarbon gases and vapors to the atmosphere.

B. Any other petroleum liquid storage tank shall be equipped with a submerged filling device, or acceptable equivalent, for the control of hydrocarbon emissions.

C. All facilities for dock loading of petroleum products, having a vapor pressure of 1.5 pounds per square inch absolute or greater at loading pressure, shall provide for submerged filling or acceptable equivalent for control of hydrocarbon emissions.

D. All pumps and compressors which handle volatile organic compounds shall be equipped with mechanical seals or other equipment of equal efficiency to prevent the release of organic contaminants into the atmosphere.

E. The monitoring of operations required by this Section is as follows:

1. The owner or operator of any petroleum liquid storage

vessel to which this Section applies shall for each such storage vessel maintain a file of each type of petroleum liquid stored, of the typical Reid vapor pressure of each type of petroleum liquid stored and of dates of storage. Dates on which the storage vessel is empty shall be shown.

2. The owner or operator of any petroleum liquid storage vessel to which this Section applies shall for such storage vessel determine and record the average monthly storage temperature and true vapor pressure of the petroleum liquid stored at such temperature if either:

a. The petroleum liquid has a true vapor pressure, as stored, greater than 26 mm Hg (0.5 psia) but less than 78 mm Hg (1.5 psia) and is stored in a storage vessel other than one equipped with a floating roof, a vapor recovery system or their equivalents; or

b. The petroleum liquid has a true vapor pressure, as stored, greater than 470 mm Hg (9.1 psia) and is stored in a storage vessel other than one equipped with a vapor recovery system or its equivalent.

3. The average monthly storage temperature shall be an arithmetic average calculated for each calendar month, or portion thereof, if storage is for less than a month, from bulk liquid storage temperatures determined at least once every seven days.

4. The true vapor pressure shall be determined by the procedures in American Petroleum Institute Bulletin 2517, amended as of February 1980 (and no future editions), which is incorporated herein by reference and on file with

the Office of the Secretary of State. This procedure is dependent upon determination of the storage temperature and the Reid vapor pressure, which requires sampling of the petroleum liquids in the storage vessels. Unless the Director requires in specific cases that the stored petroleum liquid be sampled, the true vapor pressure may be determined by using the average monthly storage temperature and the typical Reid vapor pressure. For those liquids for which certified specifications limiting the Reid vapor pressure exist, the Reid vapor pressure may be used. For other liquids, supporting analytical data must be made available upon request to the Director when typical Reid vapor pressure is used.

Historical Note

Section R18-2-710 renumbered from R18-2-510 effective November 15, 1993 (Supp. 93-4).

R18-2-719. Standards of Performance for Existing Stationary Rotating Machinery

A. The provisions of this Section are applicable to the following affected facilities: all stationary gas turbines, oil-fired turbines, or internal combustion engines. This Section also applies to an installation operated for the purpose of producing electric or mechanical power with a resulting discharge of sulfur dioxide in the installation's effluent gases.

B. For purposes of this Section, the heat input shall be the aggregate heat content of all fuels whose products of combustion pass through a stack or other outlet. Compliance tests shall be conducted during operation at the normal rated capacity of each unit. The total heat input of all operating fuel-burning units on a plant or premises shall be used for determining the maximum allowable amount of particulate matter which may be emitted.

C. No person shall cause, allow or permit the emission of particulate matter, caused by combustion of fuel, from any stationary

rotating machinery in excess of the amounts calculated by one of the following equations:

1. For equipment having a heat input rate of 4200 million Btu per hour or less, the maximum allowable emissions shall be determined by the following equation:

$E = 1.02Q^{0.769}$

where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

Q = the heat input in million Btu per hour.

2. For equipment having a heat input rate greater than 4200 million Btu/hr., the maximum allowable emissions shall be determined by the following equation:

$E = 17.0Q^{0.432}$

where "E" and "Q" have the same meaning as in subsection (C)(1).

D. For reference purposes only, the two equations in subsection (C) are plotted in Appendix 11, Figure 1. The emission values obtained from the graph are approximately correct for the heat input rates shown. However, the actual values shall be calculated from the applicable equations and rounded off to two decimal places.

E. No person shall cause, allow or permit to be emitted into the

atmosphere from any stationary rotating machinery, smoke for any period greater than 10 consecutive seconds which exceeds 40% opacity. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

F. When low sulfur oil is fires, stationary rotating machinery installations shall burn fuel which limits the emission of sulfur dioxide to 1.0 pound per million Btu heat input.

G. When high sulfur oil is fired, stationary rotating machinery installations shall not emit more than 2.2 pounds of sulfur dioxide per million Btu heat input.

H. Any permit issued for the operation of an existing source, or any renewal or modification of such a permit, shall include a condition prohibiting the use of high sulfur oil by the permittee. This condition may not be included in the permit if the applicant demonstrates to the satisfaction of the Director both that sufficient quantities of low sulfur oil are not available for use by the source and that it has adequate facilities and contingency plans to ensure that the sulfur dioxide ambient air quality standards set forth in R18-2-202 will not be violated.

1. The terms of the permit may authorize the use of high sulfur oil under such conditions as are justified.
2. In cases where the permittee is authorized to use high sulfur oil, it shall submit to the Department monthly reports detailing its efforts to obtain low sulfur oil.
3. When the conditions justifying the use of high sulfur oil no longer exist, the permit shall be modified accordingly.
4. Nothing in this Section shall be construed as allowing the use of a supplementary control system or other form of dispersion technology.

I. The owner or operator of any stationary rotating machinery subject to the provisions of this Section shall record daily the sulfur content and lower heating value of the fuel being fired in the machine.

J. The owner or operator of any stationary rotating machinery subject to the provisions of this Section shall report to the Director any daily period during which the sulfur content of the fuel being fired in the machine exceeds 0.8%.

K. The test methods and procedures required by this Section are as follows:

1. To determine compliance with the standards prescribed in subsections (C) through (H), the following reference methods shall be used:

a. Reference Method 20 in 40 CFR 60, Appendix A for the concentration of sulfur dioxide and oxygen.

b. ASTM Method D-129-91 (Test Method for Sulfur in Petroleum Products) (General Bomb Method) for the sulfur content of liquid fuels.

c. ASTM Method D-1072-90 (Test Method for Total Sulfur in Fuel Gases for the sulfur content of gaseous fuels.
2. To determine compliance with the standards prescribed in subsection (J), the following reference methods in the Arizona Testing Manual shall be used:
a. ASTM Method D-129-91 (Test Method for Sulfur in Petroleum Products) (General Bomb Method) for the sulfur content of liquid fuels.
b. ASTM Method D-1072-90 (Test Method for Total Sulfur in Fuel Gases) for the sulfur content of gaseous fuels.

Historical Note

Section R18-2-719 renumbered from R18-2-519 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-722. Standards of Performance for Existing Gravel or Crushed Stone Processing Plants

A. The provisions of this Section are applicable to the following affected facilities: primary rock crushers, secondary rock crushers, tertiary rock crushers, screens, conveyors and conveyor transfer points, stackers, reclaimers, and all gravel or crushed stone processing plants and rock storage piles.

B. No person shall cause, allow or permit the discharge of particulate matter into the atmosphere except as fugitive emissions

in any one hour from any gravel or crushed stone processing plant in total quantities in excess of the amounts calculated by one of the following equations:
1. For process sources having a process weight rate of 60,000 pounds per hour (30 tons per hour) or less, the maximum allowable emissions shall be determined by the following equation:
$E = 4.10P0.67$
where:
E = the maximum allowable particulate emissions rate in pounds-mass per hour.
P = the process weight rate in tons-mass per hour.
2. For process sources having a process weight rate greater than 60,000 pounds per hour (30 tons per hour), the maximum allowable emissions shall be determined by the following equation:
$E = 55.0P0.11-40$
where “E” and “P” are defined as indicated in subsection (B)(1).

C. For reference purposes only, the equations in subsection (B) are plotted in Appendix 11, Figure 2. The emission values obtained from the graph are approximately correct for the process weight rates shown. However, the actual values shall be calculated from the applicable equations and rounded off to two decimal places.

D. Spray bar pollution controls shall be utilized in accordance with "EPA Control of Air Emissions From Process Operations In The Rock Crushing Industry" (EPA 340/1-79-002), "Wet Suppression System" (pages 15-34, amended as of January 1979 (and no future amendments or editions)), as incorporated herein by reference and on file with the Office of the Secretary of State, with placement of spray bars and nozzles as required by the Director to minimize air pollution.

E. Fugitive emissions from gravel or crushed stone processing plants shall be controlled in accordance with R18-2-604 through R18-2-607.

F. The owner or operator of any affected facility subject to the provisions of this Section shall install, calibrate, maintain, and operate monitoring devices which can be used to determine daily the process weight of gravel or crushed stone produced. The weighing devices shall have an accuracy of ± 5% over their operating range.

G. The owner or operator of any affected facility shall maintain a record of daily production rates of gravel or crushed stone produced.

H. The test methods and procedures required by this Section are as follows:

1. The reference methods in 40 CFR 60, Appendix A shall be used to determine compliance with the standards prescribed in this Section as follows:

a. Method 5 for concentration of particulate matter and moisture content;

b. Method 1 for sample and velocity traverses;

c. Method 2 for velocity and volumetric flow rate;

d. Method 3 for gas analysis.

2. For Method 5, the sampling time for each run shall be at least 60 minutes and the minimum sample volume is 0.85 dscm (30 dscf), except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Director. Sampling shall not be started until 30 minutes after start-up and shall be terminated before shutdown procedures commence. The owner or operator of the affected facility shall eliminate cyclonic flow during performance tests in a manner acceptable to the Director.

Historical Note

Section R18-2-722 renumbered from R18-2-522 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-723. Standards of Performance for Existing Concrete Batch Plants

Fugitive dust emitted from concrete batch plants shall be controlled in accordance with R18-2-604 through R18-2-607.

Historical Note

Section R18-2-723 renumbered from R18-2-523 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-724. Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment

A. This Section applies to industrial and commercial installations which are less than 73 megawatts capacity (250 million British thermal units per hour), but in the aggregate on any premises are rated at greater than 500,000 British thermal units per hour (0.146 megawatts), and in which fuel is burned for the primary purpose of producing steam, hot water, hot air or other liquids, gases or solids and in the course of doing so the products of combustion do not come into direct contact with process materials. When any products or by-products of a manufacturing process are burned for the same purpose or in conjunction with any fuel, the same maximum emission limitations shall apply.

B. For purposes of this Section, the heat input shall be the aggregate heat content of all fuels whose products of combustion pass through a stack or other outlet. The heat content of solid fuel shall be determined in accordance with R18-2-311. Compliance tests shall be conducted during operation at the nominal rated capacity of each unit. The total heat input of all fuelburning units on a plant or premises shall be used for determining the maximum allowable amount of particulate matter which may be emitted.

C. No person shall cause, allow or permit the emission of particulate matter, caused by combustion of fuel, from any fuel-burning operation in excess of the amounts calculated by one of the following equations:

1. For equipment having a heat input rate of 4200 million Btu per hour or less, the maximum allowable emissions shall be determined by the following equation:

$E = 1.02Q^{0.769}$

where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

Q = the heat input in million Btu per hour.

2. For equipment having a heat input rate greater than 4200 million Btu/hr, the maximum allowable emissions shall be determined by the following equation:

E = 17.0Q0.432
where “E” and “Q” have the same meanings as in subsection (C)(1).

D. For reference purposes only, the two equations in subsection (C) are plotted in Appendix 11, Figure 1. The emission values obtained from the graph are approximately correct for the heat input rates shown. However, the actual values shall be calculated from the applicable equations and rounded off to two decimal places.

E. Fossil-fuel fired industrial and commercial equipment installations shall not emit more than 1.0 pounds of sulfur dioxide per million Btu heat input when low sulfur oil is fired.

F. Fossil-fuel fired industrial and commercial equipment installations shall not emit more than 2.2 pounds of sulfur dioxide per million Btu heat input when high sulfur oil is fired.

G. Any permit issued for the operation of an existing source, or any renewal or modification of such a permit, shall include a condition prohibiting the use of high sulfur oil by the permit

tee. This condition may be omitted from the permit if the applicant demonstrates to the satisfaction of the Director both that sufficient quantities of low sulfur oil are not available for use by the source and that it has adequate facilities and contingency plans to ensure that the sulfur dioxide ambient air quality standards set forth in R18-2-202 will not be violated.

1. The terms of the permit may authorize the use of high sulfur oil under such conditions as are justified.
2. In cases where the permittee is authorized to use high sulfur oil, it shall submit to the Department monthly reports detailing its efforts to obtain low sulfur oil.
3. When the conditions justifying the use of high sulfur oil no longer exist, the permit shall be modified accordingly.
4. Nothing in this Section shall be construed as allowing the use of a supplementary control system or other form of dispersion technology.

H. When coal is fired, fossil-fuel fired industrial and commercial equipment installations shall not emit more than 1.0 pounds of sulfur dioxide per million Btu heat input.

I. The owner or operator subject to the provisions of this Section shall install, calibrate, maintain and operate a continuous monitoring system for measurement of the opacity of emissions discharged into the atmosphere from the control device.

J. For the purpose of reports required under excess emissions reporting required by R18-2-310.01, the owner or operator

shall report all six-minute periods in which the opacity of any plume or effluent exceeds 15%.

K. The test methods and procedures required by this Section are as follows:

1. The reference methods in 40 CFR 60, Appendix A shall be used to determine compliance with the standards as prescribed in this Section.

a. Method 1 for selection of sampling site and sample traverses;

b. Method 3 for gas analysis to be used when applying Reference Methods 5 and 6;

c. Method 5 for concentration of particulate matter and the associated moisture content;

d. Method 6 for concentration of SO2.

2. For Method 5, Method 1 shall be used to select the sampling site and the number of traverse sampling points.

The sampling time for each run shall be at least 60 minutes and the minimum sampling volume shall be 0.85 dscm (30 dscf), except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the Director. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature no greater than 160°C. (320°F.).

3. For Method 6, the sampling site shall be the same as that selected for Method 5. The sampling point in the duct shall be at the centroid of the cross section or at a point no closer to the walls than 1 m (3.28 ft). For Method 6, the sample shall be extracted at a rate proportional to the gas velocity at the sampling point.

4. For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume 0.02 dscm (0.71 dscf) for each sample. The arithmetic mean of two samples shall constitute one run. Samples shall be taken at approximately 30-minute intervals.

5. Gross calorific value shall be determined in accordance with the applicable ASTM methods: D-2015-91 (Test for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter) for solid fuels; D-240-87 (Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter) for liquid fuels; and D-1826-88 (Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter) for gaseous fuels. The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the

fossil-fuel fired system.

Historical Note

Section R18-2-724 renumbered from R18-2-524 and amended effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 7 A.A.R. 1164, effective February 15, 2001 (Supp. 01-1).

R18-2-726. Standards of Performance for Sandblasting Operations

No person shall cause or permit sandblasting or other abrasive blasting without minimizing dust emissions to the atmosphere through the use of good modern practices. Examples of good modern practices include wet blasting and the use of effective enclosures with necessary dust collecting equipment.

Historical Note

Section R18-2-726 renumbered from R18-2-526 effective November 15, 1993 (Supp. 93-4).

R18-2-727. Standards of Performance for Spray Painting Operations

A. No person shall conduct any spray paint operation without minimizing organic solvent emissions. Such operations other than architectural coating and spot painting, shall be conSupp. 05-2 Page 90 June 30, 2005

ducted in an enclosed area equipped with controls containing no less than 96% of the overspray.

B. No person shall either:

1. Employ, apply, evaporate or dry any architectural coating containing photochemically reactive solvents for industrial or commercial purposes; or
2. Thin or dilute any architectural coating with a photochemically reactive solvent.

C. For purposes of subsection (B), a photochemically reactive solvent shall be any solvent with an aggregate of more than 20% of its total volume composed of the chemical compounds classified in subsections (1) through (3), or which exceeds any of the following percentage composition limitations, referred to the total volume of solvent:

1. A combination of the following types of compounds having an olefinic or cyclo-olefinic type of unsaturation -- hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones: 5%.
2. A combination of aromatic compounds with 8 or more carbon atoms to the molecule except ethylbenzene: 8%.
3. A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichlorethylene or toluene: 20%.

D. Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the groups or organic compounds described in subsection (C)(1) through (3), it shall be considered to be a member of the group having the least allowable percent of the total volume of solvents.

Historical Note

Section R18-2-727 renumbered from R18-2-527 effective November 15, 1993 (Supp. 93-4).

R18-2-729. Standards of Performance for Cotton Gins

A. Fugitive dust, lint, bolls, cotton seed or other material emitted from a cotton gin or lying loose in a yard shall be collected and disposed of in an efficient manner or shall be treated in accordance with R18-2-604 through R18-2-607.

B. An opacity of 40% or less shall exempt the source from mass emissions testing. In the event that the cotton gin does not comply with the 40% opacity standard, the owner or operator may request the permission of the Director to perform a mass emissions test observed by a representative of the Department. Successful completion of this test will result in an adjustment to the simultaneous opacity standard in accordance with Section R18-2-702(D).

C. No person shall cause, allow, or permit the discharge of particulate matter into the atmosphere in any one hour from any cotton gin in total quantities in excess of the amounts calculated by one of the following equations:

1. For process sources having a process weight rate of 60,000 pounds per hour (30 tons per hour) or less, the maximum allowable emissions shall be determined by the following equation:

$E = 4.10P0.67$

where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour.

P = the process weight rate in tons-mass per hour.

2. For process sources having a process weight rate greater than 60,000 pounds per hour (30 tons per hour), the maximum allowable emissions shall be determined by the following equation:

$E = 55.0P0.11-40$

where “E” and “P” are defined as indicated in subsection (C)(1).

D. The test methods and procedures required by this Section are as follows:

1. The reference methods in the Arizona Testing Manual and 40 CFR 60, Appendix A shall be used to determine

compliance with this Section as follows:
a. Method A-2 for the measurement of particulate matter,
b. Method 1 for sample and velocity traverses,
c. Method 2 for velocity and volumetric flow rate,
d. Method 3 for gas analysis,
e. Method 9 for visible emissions.
2. For Method A-2, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.85 dry standard cubic meters per hour (0.53 dry standard cubic feet per minute), except that shorter sampling times, when necessitated by progress variables or other factors, may be approved by the Director.

Historical Note

Section R18-2-729 renumbered from R18-2-529 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-730. Standards of Performance for Unclassified Sources

A. No existing source which is not otherwise subject to standards of performance under this Article or Article 9 or 11 shall cause or permit the emission of pollutants at rates greater than the following:
1. For particulate matter discharged into the atmosphere in any one hour from any unclassified process source in total quantities in excess of the amounts calculated by one of the following equations:
a. For process sources having a process weight rate of 60,000 pounds per hour (30 tons per hour) or less, the maximum allowable emissions shall be determined by the following equation:
E = 4.10P0.67
where:
E = the maximum allowable particulate emissions rate in pounds-mass per hour.
P = the process weight rate in tons-mass per hour.
b. For process weight rate greater than 60,000 pounds per hour (30 tons per hour), the maximum allowable emissions shall be determined by the following equation:
E = 55.0P0.11-40
where “E” and “P” are defined as indicated in subsection (A)(1)(a).
2. Sulfur dioxide -- 600 parts per million.
3. Nitrogen oxides expressed as NO2 -- 500 parts per million.
B. For purposes of this Section, the total process weight from all similar units employing a similar type process shall be used in

determining the maximum allowable emission of particulate matter.

C. For reference purposes only, the two equations in subsection (A)(1) are plotted in Appendix 11, Figure 2. The emission values obtained from the graph are approximately correct for the process weight rates shown. However, the actual values shall be calculated from the applicable equations and rounded off to two decimal places.

D. No person shall emit gaseous or odorous materials from equipment, operations or premises under his control in such quantities or concentrations as to cause air pollution.

E. No person shall operate or use any machine, equipment, or other contrivance for the treatment or processing of animal or vegetable matter, separately or in combination, unless all gaseous vapors and gas entrained effluents from such operations, equipment, or contrivance have been either:

1. Incinerated to destruction, as indicated by a temperature measuring device, at not less than 1,200 degrees Fahrenheit if constructed or reconstructed prior to January 1, 1989, or 1,600 degrees Fahrenheit with a minimum residence time of 0.5 seconds if constructed or reconstructed thereafter; or
2. Passed through such other device which is designed, installed and maintained to prevent the emission of odors or other air contaminants and which is approved by the Director.

F. Materials including solvents or other volatile compounds, paints, acids, alkalies, pesticides, fertilizers and manure shall be processed, stored, used and transported in such a manner and by such means that they will not evaporate, leak, escape or be otherwise discharged into the ambient air so as to cause or contribute to air pollution. Where means are available to reduce effectively the contribution to air pollution from evapoSupp.

ration, leakage or discharge, the installation and use of such control methods, devices, or equipment shall be mandatory.

G. Where a stack, vent or other outlet is at such a level that fumes, gas mist, odor, smoke, vapor or any combination thereof constituting air pollution is discharged to adjoining property, the Director may require the installation of abatement equipment or the alteration of such stack, vent, or other outlet by the owner or operator thereof to a degree that will adequately dilute, reduce or eliminate the discharge of air pollution to adjoining property.

H. No person shall allow hydrogen sulfide to be emitted from any location in such manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 0.03 parts per million by volume for any averaging period of 30 minutes or more.

I. No person shall cause, allow or permit discharge from any stationary source carbon monoxide emissions without the use of complete secondary combustion of waste gases generated by any process source.

J. No person shall allow hydrogen cyanide to be emitted from any location in such manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 0.3 parts per million by volume for any averaging period of eight hours.

K. No person shall allow sodium cyanide dust or dust from any other solid cyanide to be emitted from any location in such manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 140 micrograms per cubic meter for any averaging period of eight hours.

L. No owner or operator of a facility engaged in the surface coating of miscellaneous metal parts and products may operate a coating application system subject to this Section that emits volatile organic compounds in excess of any of the following:

1. 4.3 pounds per gallon (0.5 kilograms per liter) of coating, excluding water, delivered to a coating applicator that applies clear coatings.
2. 3.5 pounds per gallon (0.42 kilograms per liter) of coating, excluding water delivered to a coating applicator in a coating application system that is air dried or forced warm air dried at temperatures up to 194°F (90°C).
3. 3.5 pounds per gallon (0.42 kilograms per liter) of coating, excluding water, delivered to a coating applicator that applies extreme performance coatings.
4. 3.0 pounds per gallon (0.36 kilograms per liter) of coating, excluding water, delivered to a coating applicator for all other coatings and application systems.

M. If more than one emission limitation in subsection (L) applies to a specific coating, then the least stringent emission limitation shall be applied.

N. All VOC emissions from solvent washings shall be considered in the emission limitations in subsection (L), unless the solvent is directed into containers that prevent evaporation into the atmosphere.

Historical Note
Renumbered from R18-2-530 and amended effective November 15, 1993 (Supp. 93-4).

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Appendix B.3

R18-2-801 and 804

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ARTICLE 8. EMISSIONS FROM MOBILE SOURCES (NEW AND EXISTING)

Section
R18-2-801. Classification of Mobile Sources
R18-2-804. Roadway and Site Cleaning Machinery

R18-2-801. Classification of Mobile Sources

A. This Article is applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization but are not classified as motor vehicles, agricultural vehicles, or agricultural equipment used in normal farm operations.

B. Unless otherwise specified, no mobile source shall emit smoke or dust the opacity of which exceeds 40%.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1).
Amended effective September 26, 1990 (Supp. 90-3).
Amended effective February 3, 1993 (Supp. 93-1).
Former Section R18-2-801 renumbered to Section R18-2-901, new Section R18-2-801 renumbered from R18-2-601 effective November 15, 1993 (Supp. 93-4).

R18-2-804. Roadway and Site Cleaning Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the cleaning of any site, roadway, or alley without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions may include applying dust suppressants. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1).
Amended effective September 26, 1990 (Supp. 90-3).
Amended effective February 3, 1993 (Supp. 93-1).
Former Section R18-2-804 renumbered to Section R18-2-904, new Section R18-2-804 renumbered from R18-2-604 effective November 15, 1993 (Supp. 93-4).

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APPENDIX C

Yuma Agricultural Best Management Practices Rules
R18-2-609, R18-2-612 through 614

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ARTICLE 6. EMISSIONS FROM EXISTING AND NEW NONPOINT SOURCES

R18-2-609. Agricultural Practices

A person shall not cause, suffer, allow, or permit the performance of agricultural practices outside the Phoenix and Yuma planning areas, as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210, including tilling of land and application of fertilizers without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-609 renumbered from R18-2-409 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 6 A.A.R. 2009, effective May 12, 2000 (Supp. 00-2). Amended by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

R18-2-612. Definitions for R18-2-613

1. “Access restriction” means restricting or eliminating public access to noncropland with signs or physical obstruction.
2. “Aggregate cover” means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.
3. “Artificial wind barrier” means a physical barrier to the wind.
4. “Bed row spacing” means increasing or decreasing the size of a planting bed area to reduce the number of passes and soil disturbance by increasing plant density.
5. “Best management practice” means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM10 emissions from a regulated agricultural activity.
6. “Chemical irrigation” means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.
7. “Combining tractor operations” means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.
8. “Commercial farm” means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Yuma PM10 nonattainment area.
9. “Commercial farmer” means an individual, entity, or joint operation in general control of a commercial farm.
10. “Conservation irrigation” means the use of drips, sprinklers, or underground lines to conserve water, and to reduce the weed population, the need for tillage, and soil compaction.
11. “Conservation tillage” means types of tillage that reduce

the number of passes and the amount of soil disturbance.
12. “Cover crop” means plants or a green manure crop grown for seasonal soil protection or soil improvement.
13. “Critical area planting” means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.
14. “Cropland” means land on a commercial farm that:
a. Is within the time-frame of final harvest to plant emergence;
b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
c. Is a turn-row.
15. “Cross-wind ridges” means soil ridges formed by a tillage operation.
16. “Cross-wind strip-cropping” means planting strips of alternating crops within the same field.
17. “Cross-wind vegetative strips” means herbaceous cover established in one or more strips within the same field.
18. “Equipment modification” means modifying agricultural equipment to prevent or reduce particulate matter generation from cropland.
19. “Limited activity during a high-wind event” means performing no tillage or soil preparation activity when the measured wind speed at six feet in height is more than 25 mph at the commercial farm site.
20. “Manure application” means applying animal waste or biosolids to a soil surface.
21. “Mulching” means applying plant residue or other material that is not produced onsite to a soil surface.
22. “Multi-year crop” means a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.
23. “Night farming” means performing regulated agricultural activities at night when moisture levels are higher and winds are lighter.
24. “Noncropland” means any commercial farmland that:
a. Is no longer used for agricultural production;
b. Is no longer suitable for production of crops;
c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or
d. Includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head.
25. “Permanent cover” means a perennial vegetative cover on cropland.
26. “Planting based on soil moisture” means applying water to soil before performing planting operations.
27. “Precision farming” means use of satellite navigation to

calculate position in the field, to reduce overlap during field operations, and allow operations to occur during nighttime and inclement weather, thus generating less PM10.
28. “Reduce vehicle speed” means operating farm vehicles or farm equipment on unpaved farm roads at speeds not to exceed 20 mph.
29. “Reduced harvest activity” means reducing the number of harvest passes using a mechanized method to cut and remove crops from a field.

30. “Regulated agricultural activity” means a commercial farming practice that may produce PM10 within the Yuma PM10 nonattainment area.
31. “Residue management” means managing the amount and distribution of crop and other plant residues on a soil surface.
32. “Sequential cropping” means growing crops in a sequence that minimizes the amount of time bare soil is exposed on a field.
33. “Surface roughening” means manipulating a soil surface to produce or maintain clods.
34. “Synthetic particulate suppressant” means a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, and polyacrylamide, an emulsion of a petroleum product, and an enzyme product that is used to control particulate matter.
35. “Tillage and harvest” means any mechanical practice that physically disturbs cropland or crops on a commercial farm.
36. “Tillage based on soil moisture” means applying water to soil before or during tillage, or delaying tillage to coincide with precipitation.
37. “Timing of a tillage operation” means performing tillage operations at a time that will minimize the soil’s susceptibility to generate PM10.
38. “Transgenic crops” means the use of genetically modified crops such as “herbicide ready” crops, which reduces the need for tillage or cultivation operations, and reduces soil disturbance.
39. “Track-out control system” means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road.
40. “Tree, shrub, or windbreak planting” means providing a woody vegetative barrier to the wind.

41. “Watering” means applying water to noncropland.
42. “Yuma PM10 nonattainment area” means the Yuma PM10 planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.

Historical Note

New Section R18-2-612 renumbered from R18-2-610 at 6 A.A.R. 2009, effective May 12, 2000 (Supp. 00-2). Former Section R18-2-612 renumbered to R18-2-614; new Section R18-2-612 made by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

R18-2-613. Yuma PM10 Nonattainment Area; Agricultural Best Management Practices

A. A commercial farmer shall comply with this Section by August 1, 2005.

B. A commercial farmer who begins a regulated agricultural activity after August 1, 2005, shall comply with this Section within 60 days after beginning the regulated agricultural activity.

C. A commercial farmer shall implement at least one of the best management practices from each of the following categories at each commercial farm:
1. Tillage and harvest, subsection (E);
2. Noncropland, subsection (F); and
3. Cropland, subsection (G).

D. A commercial farmer shall ensure that the implementation of each selected best management practice does not violate any other local, state, or federal law.

E. A commercial farmer shall implement at least one of the following best management practices to reduce PM10 emissions from tillage and harvest:
1. Bed row spacing,
2. Chemical irrigation,
3. Combining tractor operations,
4. Conservation irrigation,
5. Conservation tillage,
6. Equipment modification,
7. Limited activity during a high-wind event,
8. Multi-year crop,
9. Night farming,
10. Planting based on soil moisture,
11. Precision farming,
12. Reduced harvest activity,
13. Tillage based on soil moisture,
14. Timing of a tillage operation, or
15. Transgenic crops.

F. A commercial farmer shall implement at least one of the following best management practices to reduce PM10 emissions

from noncropland:
1. Access restriction;
2. Aggregate cover;
3. Artificial wind barrier;
4. Critical area planting;
5. Manure application;
6. Reduce vehicle speed;
7. Synthetic particulate suppressant;
8. Track-out control system;
9. Tree, shrub, or windbreak planting; or
10. Watering.

G. A commercial farmer shall implement at least one of the following best management practices to reduce PM10 emissions from cropland:
1. Artificial wind barrier;
2. Cover crop;
3. Cross-wind ridges;
4. Cross-wind strip-cropping;
5. Cross-wind vegetative strips;
6. Manure application;
7. Mulching;
8. Multi-year crop;
9. Permanent cover;
10. Planting based on soil moisture;
11. Precision farming;
12. Residue management;
13. Sequential cropping;
14. Surface roughening; or
15. Tree, shrub, or windbreak planting.

H. A person may develop different practices not contained in subsections (E), (F), or (G) that reduce PM10. A person may submit practices that are proven effective through on-farm demonstration trials to the Director. The Director shall review the submitted practices.

I. A commercial farmer shall maintain records demonstrating compliance with this Section. The commercial farmer shall provide the records to the Director within two business days of written notice to the commercial farmer. The records shall contain:
1. The name of the commercial farmer,
2. The mailing address or physical location of the commercial farm, and
3. The best management practices selected for tillage and harvest, noncropland, and cropland by the commercial farmer, and the date each best management practice was implemented.

Historical Note
New Section made by final rulemaking at 11 A.A.R.
2210, effective July 18, 2005 (Supp. 05-2).

R18-2-614. Evaluation of Nonpoint Source Emissions
Opacity of an emission from any nonpoint source shall not be greater than 40% measured according to the Arizona Testing Manual, Reference Method 9. An open fire permitted under R18-2-602 or regulated under Article 15 is exempt from this requirement.
Historical Note
Section R18-2-614 renumbered from R18-2-612;
amended by final rulemaking at 11 A.A.R. 2210, effective
July 18, 2005 (Supp. 05-2).

APPENDIX D

Yuma Public Information Pamphlets:

How Can I Protect My Family in Yuma from Dust Pollution
Como Puedo Proteger a Mi Familia de la Polucion de Polvo en Yuma

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Appendix D.1

Yuma Public Information Pamphlet
(English version)

How Can I Protect My Family in Yuma from Dust Pollution

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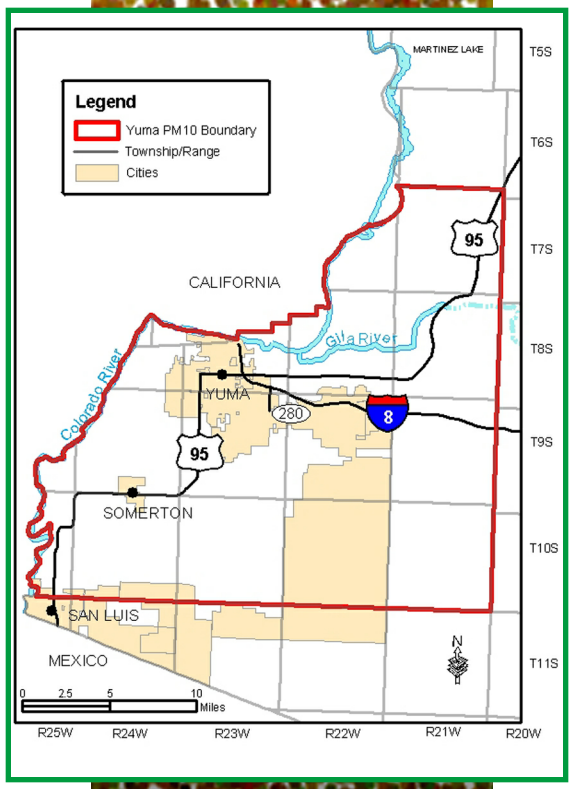
Yuma PM_{10} Nonattainment Area



How Can I Make a Dust Complaint?

Dust complaints should initially be made to the cities of Yuma or Somerton, Yuma County, or the Irrigation District; they will make referrals to law enforcement when appropriate.

City of Yuma 327-4500

Yuma County 217-DUST

City of Somerton 627-9876 or 627-5380

North Gila Irrigation District 343-9447

Unit B Irrigation District 627-8891

Yuma County Water Users' Association
627-8824

Yuma Irrigation District 726-1047

Yuma Mesa Irrigation and Drainage District
726-4353

Wellton-Mohawk Irrigation and Drainage District
785-3351

ADEQ: Agricultural Dust Complaints
(602) 771-2324 or
toll free at (800) 234-5677 Ext: 771-2324
TDD: (602) 771-4829 (Hearing impaired)

Arizona Department of Agriculture
Compliance Assistance - (602) 542-3484 or
toll free at (800) 294-0308 Ext: 542-3484

ADEQ Arizona Department of Environmental Quality

ADEQ Main Office
1110 W. Washington St.
Phoenix, AZ 85007
Web site: www.azdeq.gov

May 2005
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printed on recycled paper

How Can I Protect My Family in Yuma from Dust Pollution

ADEQ Arizona Department of Environmental Quality

Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

What is Particulate Matter and What is PM_{10}?

Particulate matter is a combination of fine solids such as ash, dirt, mold, pollen, smoke, soot, droplets, and fine particles suspended in the air, primarily from cars, trucks, offroad engines and burning of coal and natural gas. Droplets and fine particles are formed in the atmosphere from gaseous pollutants, such as volatile organic compounds, sulfur dioxide, and nitrogen oxides. These particles can come from almost any source. PM_{10} is particulate matter up to 10 microns (a micron is one millionth of a meter) in size. A human hair is about 70 microns wide.

Why Is PM_{10} Bad for Me?

When PM_{10} is in the air, we breathe it into our lungs where it can aggravate asthma and cause coughing, difficult or painful breathing, and contribute to chronic bronchitis, decreased lung function, and premature death. The elderly, children, and people with chronic lung diseases (including asthma, chronic bronchitis and emphysema) and heart disease are more sensitive to high levels of particulates. The Clean Air Act established national health standards for particulate matter and 5 other pollutants because of their health impacts.

Does Yuma Meet the PM_{10} Health Standards?

Yes. The Arizona Department of Environmental Quality (ADEQ) submitted a PM_{10} State Implementation Plan (SIP) that demonstrated that the Yuma area met the PM_{10} health standards. The SIP was submitted to EPA in November 1991, and a revised plan was submitted to EPA in July 1994. The control measures in the plan have reduced PM_{10} emissions significantly from pre-1991 levels. The Yuma area violated the health standard on August 18, 2002, as a result of a violent thunderstorm, which has been treated as an uncontrollable natural event. Because of that day, ADEQ and interested stakeholders have developed a Natural Events Action Plan (NEAP) to control dust in Yuma to the extent feasible and also inform people of impending or current events where PM_{10} could cause problems for people.

Sources of Particulate Matter

Particulates come from a variety of sources in the Yuma area, such as construction sites, agricultural fields, track-out from construction sites and agricultural fields, paved roads, open burning, industrial sources, uncovered trucks, unpaved roads, and off-road vehicles.

Things We Can Do

- Avoid using unpaved roads.
- Drive slower on unpaved roads and other dirt surfaces.
- Do not ride dirt bikes, ATVs, or other off-road vehicles in prohibited areas or on windy days.
- Post or barricade unpaved canal roads.

- Call Irrigation Districts to report unauthorized vehicles on Irrigation Districts' canal roads.
- Report dusty construction sites, trackout onto paved roads, and dusty farm activities to listed Dust Complaint numbers.
- Cover trucks hauling dust-producing material.

- Add native plants or apply water or dust suppressants to vacant or unimproved lots.
- Use leaf vacuums instead of leaf blowers at homes and businesses.
- Implement dust control plans at city and county permitted construction sites.

- Use Agricultural Best Management Practices in field operations.

Appendix D.2

Yuma Public Information Pamphlet
(Spanish version)

Como Puedo Proteger a Mi Familia de la Polucion de Polvo en Yuma

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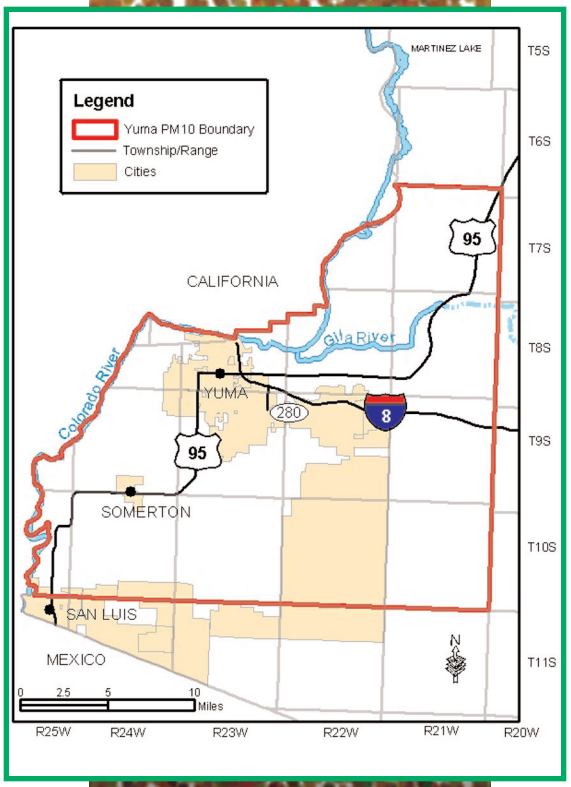
Área de "No-Cumplimiento" de las Normas de PM_{10} en Yuma



¿Como Puedo Presentar una Queja Sobre Polvo?

Quejas sobre polvo deben presentarse primeramente a las ciudades de Yuma o Somerton, al condado de Yuma, o al Distrito de Irrigación; ellos darán saber a las autoridades apropiadas, si es necesario.

Ciudad de Yuma 373-4500

Condado de Yuma 217-DUST

Ciudad de Somerton 627-9876 or 627-5380

Distrito de Irrigación de North Gila 343-9447

Distrito de Irrigación Unit B 627-8891

Asociación de Usuarios de Agua del Condado de Yuma 627-8824

Distrito de Irrigación de Yuma 726-1047

Distrito de Irrigación y de Drenaje de Yuma Mesa 726-4353

Distrito de Irrigación y de Drenaje de Wellton-Mohawk 785-3351

ADEQ: Quejas de Polvo por Actividades de Agricultura (602) 771-2324 o sin cobro al (800) 234-5677 Ext: 771-2324
TDD: (602) 771-4829 (oído dañado)

Ministerio de Agricultura del Estado de Arizona, Departamento de Asistencia para Conformidad de la Ley - (602) 542-3484 o sin cobro al(800) 294-0308 Ext: 542-3484

ADEQ Arizona Department of Environmental Quality

Oficinas Centrales del ADEQ
1110 W. Washington St.
Phoenix, AZ 85007
Sitio de la red: www.azdeq.gov

Mayo del 2005
Publicación No. C 04-12
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¿Como Puedo Proteger a Mi Familia de la Polución de Polvo en Yuma?

ADEQ Arizona Department of Environmental Quality

Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

¿Que as Materia Particulada y Que Es PM10?

Materia particulada es una combinación de materiales sólidos finos como ceniza, tierra, moho, polen, humo, hollín y gotitas, y de otras partículas finas que son suspendidas en el aire. Estos materiales suceden por la mayoría como resultado de emisiones de autos, camiones y motores, y de la quemazón de carbón y gas natural. Las gotitas y partículas finas se forman en la atmósfera como resultado de contaminantes gaseosos como compuestos volátiles orgánicos, dióxido de azufre, y óxidos de nitrógeno. Estas partículas pueden ser resultado de una gran cantidad de tipos de fuentes. PM_{10} es una materia particulada que mide hasta 10 micrones (un micrón mide un millón de un metro) de tamaño. Un cabello humano mide como 70 micrones de ancho.

¿Porque es Malo el PM_{10}?

Cuando el PM_{10} se encuentra en el aire, lo respiramos dentro de nuestros pulmones donde puede agravar el asma y causar tos, dolor al respirar, y contribuir a bronquitis crónico, funcionamiento disminuido de los pulmones, y muerte prematura. Los ancianos, los niños, y gente con enfermedades crónicas de los pulmones (incluyendo al asma, bronquitis crónico, y enfisema) o con enfermedades del corazón son más susceptibles a niveles altos de partículas. El Acta de Aire Limpio estableció los criterios nacionales de salud relacionados a materia particulada y cinco otros contaminantes.

¿Satisface los Criterios Nacionales de PM_{10} la Ciudad de Yuma?

Si. El Ministerio de Calidad Ambiental del Estado de Arizona (ADEQ, por sus siglas en inglés) presentó un plan a la Agencia Federal de Protección Ambiental (EPA, por sus siglas en inglés) en noviembre de 1991. El plan de implementación por parte del estado (SIP, por sus siglas en inglés) demuestra que el área de Yuma satisface los criterios nacionales relacionados al PM_{10}. Una versión enmendada del plan fue presentada a la EPA en julio de 1994. Las medidas de control que forman parte del plan han disminuido los niveles de emisiones de PM_{10} significantemente, a comparación con los niveles que se registraban antes del 1991. El área de Yuma cometió una infracción de los criterios de salud el 18 de agosto del 2002. Una tormenta violenta, la cual se considera un evento incontrolable, contribuyó a esta infracción. Como reacción a ese día de tormenta, el ADEQ y otras partes interesadas han desarrollado un plan para eventos naturales (NEAP, por sus siglas en inglés) para controlar el polvo en Yuma a un nivel viable, y para advertir a la gente de eventos que puedan causar problemas de PM_{10}.

Fuentes de Materia Particulada

En el área de Yuma, las partículas pueden originarse como resultado de fuentes como sitios de construcción o campos de agricultura, o por desparrame de polvo causado por llantas en estos sitios; caminos con o sin pavimento; sitios de quemazones o industria; camionetas de carga sin tapaderas; o otros vehículos terrenales.

¿Que Podemos Hacer?

- Procure usar caminos con pavimento.
- Conduzca su auto a velocidades más lentas en caminos sin pavimento o en otras superficies de tierra.

- No conduzca su moto terrenal, ATV, u otros vehículos terrenales en áreas prohibidas o durante días de viento.
- Marque o coloque barricadas para caminos sin pavimento a lo largo del canal.
- Llame a los distritos de irrigación para denunciar a los vehículos inautorizados que usen esos caminos a lo largo del canal.

- Denuncie sitios de construcción polvorosos, desparrame de materiales en los caminos, y actividades de agricultura que causen polvo a los números de teléfono proveídos para presentar quejas sobre polvo.
- Cubra los camiones que cargan materiales que producen polvo con tapaderas seguras.
- Siembre plantas nativas, riegue o suprima el polvo de sitios vacantes.

- Utilice aspiradoras de hojas en lugar de sopladores en sitios residenciales o de negocio.
- Realice planes para controlar el polvo en sitios de construcción regulados por la ciudad o por el condado.

- Utilice las mejores prácticas y administración durante operaciones de agricultura.

APPENDIX E

Yuma Outreach and Notification Resource List

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Yuma Public Education
And Outreach Resources List

Name	Title	Company	Phone	Responsibility Effective date August 01, 2005	E-Mail
Charlene Fernandez	Community Liaison	ADEQ	Office (928)373-9432 Mobile- (928) 580-6431	To disseminate all health and educational material, brochures made available through ADEQ and the dust control action forecast to Yuma stakeholder list.	Fernandez.Charlene@azdeq.gov ADEQ website: www.azdeq.gov
Gerardo Mayoral	Boarder Air Monitoring Coordinator	ADEQ	Office (928) 373-2332	Mr. Mayoral, assists Ms. Fernandez in her absence, with the dissemination of health and educational, brochures made available through ADEQ and dust control action plan.	gem@azdeq.gov
Luis Miranda	Development Services Coordinator	Yuma County	(928) 329-2300	Yuma, County has developed a brochure about the acute and chronic health effects of PM_{10} that is available for dissemination by others.	envprograms@co.yuma.az.us Yuma County website: www.co.yuma.az.us/dds/EP/epmain.htm
Kevin Tunell	Public Information Officer	Yuma County	(928) 373-1111	Yuma, County has developed Public Service Announcement.	Kevin.tunell@co.yuma..az.us
Marcia Colquitt	Field Consultant	Arizona Department of Agriculture	(602) 542-3484	Department of Agriculture notifies the farmers of the dust control action forecasts.	marcia.colquitt@agric.state.az.us
Flor Redondo	Program Director	Campesinos Sin Fronteras	(928) 627-1060	Campesinos Sin Fronteras is doing awareness training in Somerton, for the Spanish speaking farm workers.	Redondos1272@aol.com
Kathleen Sommer	Senior Planner	Arizona Department of Transportation	(602) 712-7166	Arizona Department of Transportation notifies road construction crews of the dust control action forecast	ksommer@azdot.gov tpdcoqs@azdot.gov

Name	Title	Company	Phone	Responsibility Effective date August 01, 2005	E-Mail
Beverly Chenausky	Manager Air Quality Branch	Arizona Department of Transportation	(602) 712-7487	Ms. Chenausky assists Ms. Sommer with notification of the road construction crews of the dust control action forecast	bchenausky@azdot.gov
Ibrahim Osman	CIP Project Manager	City of Yuma	(928) 373-4531	Ibrahim Osman receives the dust control action forecast for the City of Yuma and notifies the appropriate crews that work in the City of Yuma.	ibrhim.osman@ci.yuma.az.us
Eddie Mendez	Director of Public Works	City of Somerton	(928) 627-4115	Eddie Mendez receives the dust control action and notifies appropriate crews that work in the City of Somerton.	eddiem@cityofsomerton.com
Elvira Villalpando	Director of School Base Healthcare Program	Yuma Regional Medical Center	(928) 336-7159	Ms. Villalpando, receives the dust control action forecast. Her staff is limited to providing primary care for children without health insurance. These children will be notified of the need to minimize exposure to dust.	evillalpando@yumareigonal.org
Tracy Register	Environmental Protection Office Director	Cocopah Indian Tribe	(928) 627-2025 Ext.-13	Mr. Register will receive the dust control action forecast for the Cocopah Tribe to notify the daycare centers and the senior population located on the reservation of the need to minimize exposure to dust.	cocoepo@c2i2.com
Ernie Jimenez	Lot Development	H&S Developers	(928) 581-1374	Mr. Jimenez will receive the dust control action forecast. He will notify appropriate crews in the event of a high wind forecast.	ernie@foothillsonline.com

Name	Title	Company	Phone	Responsibility Effective date August 01, 2005	E-Mail
Marie Stewart	Marine Corp. Air Station		(928) 269-6669	Ms Stewart is available to speak at schools to educate children of the need to minimize exposure to dust.	Marie.stewart@usmc.mil
Sheryl Christenson	Coordinator	Yuma Conservation Garden	(928) 317-1935	Yuma Conservation Garden assists with outreach and public education for $PM_{10}$and receives the dust control forecast.	www.yum,aedsupport.org
Jill Harrison	Executive Director	Western Arizona Council of Government	(928)217-7122	Ms. Harrison receives the dust control action plan to create awareness in the senior population to minimize exposure to high concentration of PM_{10}	jill@wacog.com
Lanita Henderson	CEO	Missing Piece Care Management Service	(928) 316-0778	Ms. Henderson and her staff provide in home care services for seniors with disabilities that may be affected by high concentration of PM_{10} to minimize exposure	mpcms@missingpiececare.com
Charles Botdorf	Environmental Director	Yuma Proving Ground	(928) 328-2754	Mr.Botdorf receives the dust control action forecast. He will disseminate information to appropriate sources of dust.	Charles.botdorff@yuma.army.mil
Charles Ruerup	Compliance Manager	Yuma Proving Ground	(928) 328-2977	Mr. Ruerup l receives the dust control action forecast. He is the back-up to Mr. Botdorf receiving the forecast and will disseminate in the absence Mr. Botdorf.	Charles.ruerup@yuma.army.mil

Other web-sites to visit that may useful in PM10 public education. Posters and brochures may be printed out.

http://www.epa.gov/air/urbanair/pm/index.html

http://www.epa.gov/ebtpages/airairpollutantsparticulatematterpm.html

http://epa.gov/

http://www.wrapair.org

www.azdeq.gov

http://www.epa.gov/ebtpages/air.html

http://cfpub.epa.gov/airnow/index.cfm?action=smokefires.main

APPENDIX F

Example of Yuma Dust Control Action Forecast

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ADEQ Arizona Department of Environmental Quality

Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

YUMA AND VICINITY
DUST CONTROL ACTION FORECAST
ISSUED SUNDAY, FEBRUARY 26, 2006
Three-day weather outlook:

High pressure will begin to be pushed east by a strong trough of low pressure from the Pacific on Monday. This trough will tap into some subtropical moisture and stream it into our region as it moves across the southwest U.S. This means there is a chance of seeing some rain in Arizona, including the Yuma forecast area, late Tuesday into Wednesday. Winds will be mostly light through Wednesday. Thus the risk for wind-blown dust in Yuma will be LOW during this forecast period, especially if we get rain to dampen the ground.

	WINDS	WIND BLOWN DUST RISK
Day #1: Mon 02/27/2006	No significant wind is expected.	**LOW**
Day #2: Tue 02/28/2006	No significant wind is expected. (10% chance of rain)	**LOW**
Day #3: Wed 03/01/2006	Southwest winds 10-20 mph are possible during the afternoon hours.	**LOW**

PM-10 & PM-2.5 (PARTICLES)

Description – The term "particulate matter" (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are referred to as "fine" particles and are responsible for many visibility degradations (brown cloud). Particles with diameters between 2.5 and 10 micrometers are referred to as "coarse".

Sources – Fine = All types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Coarse = crushing or grinding operations and dust from paved or unpaved roads.

Potential health impacts – PM can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis.

Units of measurement – Micrograms per cubic meter (ug/m3)

Averaging interval – 24 hours (midnight to midnight).

Reduction tips – Stabilize loose soils, minimize travel on dirt roads, utilize tarps on haul trucks, limit use of leaf-blowers, and on high-wind days reduce outdoor activities.

CKR 05/09/2005

APPENDIX G

Tables Listing the Reasonably Available Control Measures Implemented during 1994 – 1999 Not Incorporated in the State Implementation Plan for the Yuma Nonattainment Area

and

Table Listing the Marine Corps Air Station Reasonably Available Control Measures Implemented during 1995 – 1999 Not Incorporated in the State Implementation Plan for the Yuma Nonattainment Area

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Appendix G.1

Table Listing the Local Government Agencies Reasonably Available Control Measures Implemented during 1994 – 1999 Not Incorporated in the State Implementation Plan for the Yuma Nonattainment Area

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Local Government Agencies Annual RACM Reporting Form

Updated 2/28/06

AGENCY	SIP RACM	1994	1995	1996	1997	1998	1999
City of Yuma	Paving unpaved roads[i]			Paved 1.82 miles	Paved 0.872 miles Paved 2.17 miles[ii]	Paved 0246 miles Paved l.75. miles[iii]	Paved 0.246 miles Paved l.61 miles[iv]
	Closing unpaved roads	Closed 0 62 miles				Closed 0.15 miles	Closed 0.15 miles
	Chemically stabilize unpaved roads	Chemical palliative – 0.11 miles	Watered streets – 390 miles				
	Paved parking lots			Paved 90,000 sq. ft. of gravel parking lots	Paved111,250 sq. ft. of gravel parking lots		

AGENCY	SIP RACM	1994	1995	1996	1997	1998	1999
City of Yuma	Traffic re-routing or rapid cleanup of temporary sources of dust and spills						
	Covering haul trucks	Yuma City-Ordinance 2638					
	Dust control plans for construction projects	Ordinance requiring dust control plans					
	Soil stabilization	Require soil stabilization on lot cleanup program					
	Building code amds	Building code amendments		Modified building code to require dust control plans for large construction projects			
			Watered street. shoulders – 1820 miles[v]				
		Swept 183 miles of city roads[vi]				Increased street sweeping to 1,183 miles	

AGENCY	SIP RACM	1994	1995	1996	1997	1998	1999
							Installed 1.61 miles of gutter and sidewalks[vii]
						Bum permits issued for 20.5 acres (brush, weeds)	Bum permits issued for 220.0 acres (weeds, tree trimmings plants, plant material)
Town of Somerton	Paving unpaved roads	Paved 0.25 miles					
		Annually paved average of 0.83 miles of alley[viii]		Paved 0.1 miles of alley	Annually paved average of 0.83 miles of alley		
	Traffic re-routing or rapid cleanup of temporary sources of dust and spills	Developed written policy for street cleanup and r-routing					
	Covering haul trucks	Somerton Resolution 405					

AGENCY	SIP RACM	1994	1995	1996	1997	1998	1999
Town of Somerton	Dust control plans for construction projects	Implemented on a continual basis					
	Soil stabilization				Graveled 83,400 sq. ft. dirt parking lot[ix]		
			Watered unpaved roads - 1,350 miles	Annually watered unpaved roads – 1,560 miles			
			Annually watered street shoulders – 1,820 miles				
			Annually swept 3,238 miles of paved roads				
						Reconstructed 13,267 sq. yds parking area	
					Reconstructed curbs and gutters – 0.2 miles[x]	Reconstructed curbs and gutters - 0.34 miles	
Yuma County	Paving unpaved roads	Paved 15 miles	Chip sealed 9.5 miles of gravel road	Applied lignosite chip seal to 5 miles	Chip sealed 5.7 miles		Paved 15 miles

AGENCY	SIP RACM	1994	1995	1996	1997	1998	1999
Yuma County	Stabilizing unpaved roads		Stabilized unpaved roads – 5.3 miles	Stabilized unpaved roads – 36 75 miles with mag chloride	Stabilized unpaved roads – 43 miles with mag chloride	Annually stabilized unpaved roads – 86 miles with magnesium chloride	
	Traffic re-routing or rapid cleanup of temporary sources of dust and spills						
	Covering haul trucks	Yuma County Resolution No. 91-38					
	Dust control plans for construction projects[xi]	Implemented on a continual basis					
					Annually swept streets – 3,238 miles		
			Watered alleys – 24 miles				

AGENCY	SIP RACM	1994	1995	1996	1997	1998	1999
Yuma County						Applied chip seal to 21.5 miles of unpaved road shoulders	
Irrigation Districts: Yuma County Water User's Assoc. Yuma Mesa Irrigation District Unit B Irrigation District Yuma Irrigation District North Gala Irrigation District	Reduced traffic on unpaved roads	Reduced use of heavy equipment on canal banks by introducing weed eating white amur fish[xii]	Restock white amur fish in 1995[xiii]	Restock 8,420 white amur fish	Annually restock 8,400 white amur		
					Added signs and barricades	Maintained signs and barricades	Added 50 new "no trespassing" signs
			Closed 1.2 miles of canal road	Patrolled 400 miles of unpaved canal banks			Closed 2.4 miles of canal road
			Pipelined ⅞ mile of canal	Pipelined 0.5 mile of canal	Pipelined .64 mile of canal		Pipelined 4 mile of canal
ADOT		ADOT requires contractor to adhere to local dust control plans					

[i] Information for the City of Yuma provided for the Yuma Metropolitan Planning Organization.

[ii] Paving occurred on 24th Ave.

[iii] Paving occurred on 12th St. between Aves. B and C.

[iv] Paving occurred on the USBR Main & East Canal between 8th St. and Colorado River Levee.

[v] Information for the City of Yuma provided by the Yuma Metropolitan Planning Organization.

[vi] Street sweeping occurred a minimum of once a week for arterials and selected collector streets and five times per year for all other paved streets.

[vii] Along 24th Ave.

[viii] Information from the Town of Somerton Public Works Dept.

[ix] Information for this RACM provided by the Yuma Metropolitan Planning Organization.

[x] Information for the Town of Somerton provided by the Yuma Metropolitan Planning Organization.

[xi] The contractor shall apply a dust palliative to the area causing dust as a result of the construction operation or traffic. Frequency shall be enough to eliminate all dust from the project. The contractor shall apply palliative when directed by the County Engineer.

[xii] The introduction of white amur into the Yuma area canals result in indirect PM_{10} emission reductions by reducing the need to run heavy equipment on the canal bank to dredge the canal. The effectiveness of this measure was modeled in the "reduce traffic on unpaved roads" control measure (see Table 6.0, p.48, l99l Yuma PM_{10} SIP).

[xiii] Information for this RACM provided by the Yuma Metropolitan Planning Organization.

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Appendix G.2

Table Listing the Marine Corps Air Station Reasonably Available Control Measures Implemented during 1995 – 1999 Not Incorporated in the State Implementation Plan for the Yuma Nonattainment Area

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AGENCY	SIP RACM	1995	1996	1997	1998	1999
Marine Corps Air Station Yuma	Length of bicycle path developed	3 miles				
	Number of trips reduced by encouraging carpooling	11,700 cars/yr	11,700 cars/yr	11,700 cars/yr	11,700 cars/yr	11,700 cars/yr
	Number of cars prevented from accessing and parking at selected locations on the air station					
	Number if administrative trips to San Diego and other off-station trips reduced through coordination of activities and carpooling	780 cars/yr	780 cars/yr	780 cars/yr	780 cars/yr	780 cars/yr
	How many miles of unpaved 14 miles of federal roads were paved					
	How many unauthorized vehicles have been prevented from using unpaved roads					
	Number of miles of secondary unpaved roads where grading and other soil disturbing actions have been minimized					
	Areas of lots identified and controlled to prevent runoff from transporting soil to paved road surfaces (approximate sq. ft.)					
	Area of wind erodible area landscaped with native plants to prevent or control windblown dust (approximate sq. ft.)					464,689 sq ft
	Area of ground where plants are cropped or mowed rather than removed (approximate sq. ft.)	63 acres	63 acres	63 acres	63 acres	63 acres
	Area of ground where large gravel was used to stabilize unvegetated area (approximate sq. ft.)					
	Length of roadway where street sweeping equipment was operated in a manner that minimizes dust, including using water during operations; Frequency at which street sweeping occurred	1,628,643 sq yds airfield sweeping	1,628,643 sq yds airfield sweeping	1,628,643 sq yds airfield sweeping	1,628,643 sq yds airfield sweeping	1,628,643 sq yds airfield sweeping
	Area of ground where parking area was covered at Building 603 with large gravel and asphalt (approximate sq. ft.)					
	Area of ground where dirt area surrounding air field was covered with asphalt (approximate sq. ft.)					
	Number of gasoline vehicles removed from use					
	Number of gas scooters removed from use					
	Area of disturbed soil constructed on		4,200 sq ft	1,739 sq ft		96,202 sq ft

	Number of cars removed from road by issuing bicycles to messengers/PMO	Removed 2600 cars/yr	Removed 2600 cars/yr	Removed 5200 cars/yr	Removed 5200 cars/yr	Removed 5200 cars/yr
	Area of parking lots that have been paved or asphalted			15,000 sq ft		813,206 sq ft
	Area that had dust palliatives or liquid surficants applied			1,540,000 sq yds	163,000 sq ft	
	Personnel trained through public outreach					
	Construction areas posted with dust complaint signage. 1 acre or more					